



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>

LANE MEDICAL LIBRARY STANFORD
RA421.U5B2 1916-17 no LAN
Hygienic Laboratory bulletin.



24501242707

MAY 21 1888

LANE

MEDICAL



LIBRARY

**JANE LATHROP STANFORD
JEWEL FUND**

LANE MEDICAL LIBRARY
STANFORD UNIVERSITY,
MEDICAL CENTER
STANFORD, CALIF. 94305

MAY 21 1885

LANE

MEDICAL



LIBRARY

**JANE LATHROP STANFORD
JEWEL FUND**

LANE MEDICAL LIBRARY
STANFORD UNIVERSITY
MEDICAL CENTER
STANFORD, CALIF. 94305

**TREASURY DEPARTMENT
UNITED STATES PUBLIC HEALTH SERVICE**

HYGIENIC LABORATORY—BULLETIN No. 106

JANUARY, 1917,

STUDIES IN PELLAGRA:

**I. TISSUE ALTERATION IN MALNUTRITION AND
PELLAGRA**

BY

JOHN SUNDWALL

**II. CULTIVATION EXPERIMENTS WITH THE BLOOD AND
SPINAL FLUID OF PELLAGRINS**

BY

EDWARD FRANCIS

**III. FURTHER ATTEMPTS TO TRANSMIT PELLAGRA
TO MONKEYS**

BY

EDWARD FRANCIS



**WASHINGTON
GOVERNMENT PRINTING OFFICE**

1917

ORGANIZATION OF HYGIENIC LABORATORY.

RUPERT BLUE, *Surgeon General,*
United States Public Health Service.

ADVISORY BOARD.

Maj. Eugene R. Whitmore, Medical Corps, United States Army; Medical Inspector E. R. Stitt, United States Navy; Dr. A. D. Melvin, chief of United States Bureau of Animal Industry; and George W. McCoy, United States Public Health Service, *ex officio*.

Prof. William H. Welch, Johns Hopkins University, Baltimore, Md.; Prof. Simon Flexner, Rockefeller Institute for Medical Research, New York; Prof. Victor C. Vaughan, University of Michigan, Ann Arbor, Mich.; Prof. William T. Sedgwick, Massachusetts Institute of Technology, Boston, Mass.; Prof. M. P. Ravenel, University of Missouri, Columbia, Mo.

LABORATORY CORPS.

Director.—Surg. George W. McCoy.
Assistant director.—Surg. A. M. Stimson.
Senior pharmacist.—C. O. Sterns, Ph. G.
Junior pharmacist.—Clyde Ritter, Ph. G.
Artist.—Leonard H. Wilder, F. R. S. A.

DIVISION OF PATHOLOGY AND BACTERIOLOGY.

In charge of division.—Surg. George W. McCoy.
Assistants.—Surgs. Hugh S. Cumming, Leslie L. Lumsden, Lunsford D. Fricks, Carroll Fox, Talliaferro Clark, A. M. Stimson; Passed Asst. Surgs. H. E. Hasseltine, James P. Leake; Ass't. Surgs. M. H. Neill, N. E. Wayson, and G. C. Lake.
Sanitary bacteriologists.—H. B. Corbitt, B. S., and Miss Ida A. Bengtoon.

DIVISION OF ZOOLOGY.

Professor of zoology.—Ch. Wardell Stiles, Ph. D.
Assistant.—Surg. Joseph Goldberger.
Technical assistant.—Walter D. Cannon, LL. B., A. B., M. D.

DIVISION OF PHARMACOLOGY.

Professor of pharmacology.—Carl Voegtlin, Ph. D.
Technical assistants.—Atherton Seidell, Ph. D.; Murray Galt Motter, A. M., M. D.; George B. Roth, A. B., M. D.
Organic Chemist.—Charles N. Myers, Ph. D.

DIVISION OF CHEMISTRY.

Professor of chemistry.—Earle B. Phelps, B. S.
Sanitary chemist.—Albert F. Stevenson, B. S.
Technical assistant.—Elias Elvove, M. S., Pharm. D.

CONTENTS.

	Page.
I. Tissue alteration in malnutrition and pellagra; by John Sundwall.....	5
Introduction.....	5
Part I. Tissue alterations in animals resulting from various vegetable diets.	5
1. Monkeys. Various diets deficient in essential constituents.....	6
2. White rats, Series I. Cellular changes resulting from diets of corn-oil cake.....	18
3. White rats, Series II. Tissue alterations resulting from starvation..	24
4. Pigs. Diets of corn-oil cake.....	27
5. Rabbit. Tissue changes due to administration of aluminum lactate.	31
Part II. Cellular changes in pellagra.....	33
1. Literature.....	33
2. Tissue changes in pellagra as observed in this laboratory.....	41
Part III. Discussion.....	53
1. Passive congestion.....	54
2. Cloudy swelling.....	55
3. Hydropic degeneration.....	57
4. Fatty degeneration and infiltration.....	57
5. Hyalin degeneration.....	59
6. Amyloid infiltration.....	60
7. Nutritional disturbances.....	61
8. Pathological alterations in the nervous system.....	63
9. Pigmentation.....	66
Conclusions.....	68
Bibliography.....	69
Explanation of figures.....	72
II. Cultivation experiments with the blood and spinal fluid of pellagrins; by Edward Francis.....	75
Method employed.....	75
Kidney tissue.....	75
Ascitic fluid.....	76
Source of material.....	76
Seeding.....	76
Spinal fluid.....	76
Results.....	77
Appendix (Case notes).....	78
III. Further attempts to transmit pellagra to monkeys; by Edward Francis...	81
Introduction.....	81
Injection of:	
Nervous tissue.....	82
Buccal, thoracic, and abdominal organs except intestines.....	84
Intestines and contents.....	85
Skin.....	87
Blood.....	88

III. Further attempts to transmit pellagra to monkeys—Continued.

	Page.
Injection of—	
Cerebrospinal fluid collected at autopsy.....	90
Spinal fluid collected during life.....	91
Pericardial fluid.....	92
Berkefeld filtrate of urine.....	92
Berkefeld filtrate of feces.....	93
Intranasal application of untreated feces.....	94
Feeding of:	
Sputum.....	95
Pellagrous tissues.....	96
Pellagrous tissues and spoiled corn meal.....	98
Feces and spoiled corn meal.....	99
Summary.....	99
Results.....	102
Appendix I. Source and disposal of inoculating material.....	103
I. Case notes.....	103
II. Autopsy notes.....	108
Appendix II. Summary of individual experiments made on each monkey.	113

I. TISSUE ALTERATION IN MALNUTRITION AND PELLAGRA.¹

By JOHN SUNDWALL, *Assistant Surgeon.*

While at the United States Public Health Hospital at Savannah it was my privilege to examine numerous tissues that had been obtained at necropsies of pellagrins. Effort was made to determine by special fixations and differential microchemical staining whether in pellagra any cellular changes or organisms are present which could be considered as characteristic of the disease. While these observations were not so extensive perhaps as they might have been, sufficient examinations were made to warrant certain conclusions. These are discussed under appropriate headings.

Later it was the writer's opportunity to examine numerous tissues which had been obtained at autopsies of certain animals which Prof. Carl Voegtlin had had under observation. These animals had been fed various diets by him with a view of producing, if possible, symptoms and tissue changes which are found in pellagra. In most instances the animals died in varying stages of emaciation. Lists of these diets, together with the clinical histories and autopsy findings, obtained from Prof. Voegtlin's notes, are included in this report.

There was a striking similarity of cell alterations seen in these animals and in those previously observed in the tissues procured from pellagrins. In fact, practically all the changes noted in the latter were observed in these animals.²

With a view of comparing these changes there are included in this report the morbid changes noted in the tissues of both series—pellagrins and experimental animals. The changes observed in the latter series are reported first, after which the alterations found in pellagrous tissue are considered.

PART I.—TISSUE ALTERATIONS IN ANIMALS RESULTING FROM VARIOUS VEGETABLE DIETS.

In most instances the tissues were procured immediately after the death of the animals. They were preserved in various fixation fluids, depending upon the particular structures to be preserved. The series

¹ Manuscript submitted for publication Aug. 20, 1915.

² The great resemblance of the chemical changes in the central nervous system of these experimental animals with those observed in pellagra were described by M. L. Koch and Carl Voegtlin in *Hygienic Laboratory Bulletin* No. 103.

consisted of monkeys, rats, pigs, and rabbits. The following is a summary of the findings:

1. MONKEYS.—VARIOUS DIETS DEFICIENT IN ESSENTIAL CONSTITUENTS.

MONKEY I.

Monkey fed on corn-oil cake. Began feeding May 13; progressive loss of weight from 3,675 grams to 2,150 grams at time of death, June 6.

AUTOPSY FINDINGS.

Very emaciated body; brain and cord removed and vertical sections taken of cerebrum near optic nerve—one in each hemisphere. Two sections of cord near first lumbar region also taken. Lungs normal; liver normal—53 grams—spleen dark; pancreas hemorrhagic; kidneys pale; adrenals normal; stomach, mucosa has small hemorrhages; small intestines, walls thin, hemorrhagic; colon shows profuse hemorrhages; entire gastro-intestinal tract empty.

MICROSCOPIC APPEARANCES.

Heart.—Myocardium: The muscle fibers are granular in appearance, cloudy swelling—much pigment in evidence but this pigment is not the typical pigment of brown atrophy—it is more or less diffuse throughout the cell, and in many instances it is difficult to distinguish it from the granular cytoplasm. The transverse striations are indistinct, many blood cells are seen between the fibers—a mild degree of congestion.

Lungs.—This particular section shows much congestion of the alveolar capillaries, and the alveolar walls are thickened; much greenish brown pigment is also seen in these thickened walls and around the larger vessels and bronchi; no leucocytic infiltrations are observed. Small areas of lymphoid cells are seen near the bronchi in some instances; but these can not be considered as abnormal.

Liver.—For the most part this appears normal; slight congestion is seen in both the central and portal veins; many blood cells are also observed in the intercellular capillaries; the cytoplasm of the cord cells appears somewhat cloudy and not distinct as in the normal; the nuclei are vesicular; one very small focus of polymorphonuclear leucocytes is observed.

Spleen.—This organ shows pronounced pathological changes. The capsule is thickened; the entire spleen pulp is congested and hemorrhagic—in fact, the red blood cells practically obscure the pulp cells—the larger vessels are intensely congested; all the malpighian areas are undergoing amyloidosis; in some practically all the lymphoid cells are masked by amyloid which stains violet red in gentian violet; Van Gieson's stain shows hyalin changes in many of the central arteries. (See Fig. 3.)

Kidney.—The capsule is congested and torn away from the parenchyma: the stellate veins are also congested; the glomeruli for the most part are congested; the cells of the urinary tubules, especially convoluted tubules, are swollen; the cytoplasm is granular; a granular detritus fills many of these tubules, which stains red in eosin; the intertubular vessels in many instances are slightly congested. Sections from other portions of kidneys show great dilatation of both the collecting and urinary tubules.

Suprarenal.—Very few changes are observed in this organ. The cytoplasm is more reticulated than normal, especially in the zona fasciculata. This may indicate an increase of lipoids.

Lymph gland.—Capillaries and sinuses are intensely congested and contain much brown pigment.

Stomach.—Pyloric region: Epithelium, intact and normal throughout; the mucosa is congested, especially in that region surrounding the fundi of glands. The muscularis mucosae is not well differentiated from the submucosa; the latter, in certain places, is somewhat congested, the muscular layer appears normal; no parietal cells are seen.

Small intestine—upper part, jejunum.—Surface epithelium is broken; the mucosa is congested and hemorrhagic; in many instances these hemorrhagic areas come in contact with the lumen; no leucocytic infiltration is observed in the mucosa; the mucosa in this section has become separated from the muscularis mucosae; the latter appears normal; the submucosa is torn and broken, some of its vessels are congested, and in certain areas red blood cells are seen loose in the surrounding tissue; the muscular layer appears normal.

Small intestine—ileum.—The surface epithelium is broken, especially on the ends of the villi. In these instances the connective tissue mucosa comes in contact with the lumen. The mucosa is injected and hemorrhagic, and there is also an increase of the cellular elements—chiefly small lymphoid cells, although both polymorphonuclear leucocytes and plasma cells are abundantly seen. The goblet cells stain deeply in much haematein; the muscularis mucosae is distinct; the submucosa is loose and many of its vessels are congested; a pronounced atrophy has occurred in the muscular layer—both layers are not more than one-half the thickness of normal. In many of these sections such changes have occurred in the epithelium and villi that it was necessary to use differential stains in order to determine the true nature of the tissues. (See Fig. 4.)

Nervous system.—Sections from tissue removed from cerebrum near optic nerve were prepared by the Pal-Weigert method and counterstained in lithium carmin. No abnormalities are observed in the cells of the cortex, and no degenerations are seen in the fibres leading from the cortex; the pia appears normal.

The spinal cord: Cervical region shows degeneration of the column of Burdach in the posterior tract. (See Fig. 1.) Lower dorsal region shows a diffuse degeneration of the myelin sheaths chiefly on one side. (See Fig. 2.) The degeneration is not limited to any particular tract, but occurs in the following regions: Anterior pyramidal, anterior and lateral margins of the anterior and lateral tracts, and a diffuse, ill-defined area in the posterior tract in both Gall's and Burdach's columns. As stated, these degenerated fibers are not sharply demarcated from the normal. The section gives the appearance macroscopically of a diffuse light band surrounding a darker zone of more normal fibers. The vessels in the gray matter are congested; some cells in the anterior horn are large and pale, although complete chromatolysis has not taken place; the other cells of the gray matter for the most part appear normal.

SUMMARY—POSITIVE FINDINGS.

Gross findings.—Very emaciated body; spleen, dark, congested; pancreas, hemorrhagic; kidneys, pale; stomach, small intestines and large intestines, hemorrhagic; small intestinal wall, thin and atrophic.

Microscopic findings.—Heart muscle, granular and pigmented; lungs, congested and pigmented; liver, slightly congested; spleen, intensely congested and has undergone amyloidosis; kidney, congested and a mild degree of albuminous

degeneration; the lower intestinal tract, hemorrhagic, congested, and atrophic; spinal cord, degenerative changes in all tracts with pronounced changes in column of Burdach in cervical region.

MONKEY II.

Began feeding with corn-oil cake in various amounts March 14. The monkey, which at first weighed 3,100 grams, began to lose weight and weighed 2,085 grams at the time of death, May 21. Diarrhea; loss of weight, erythema on face, especially when exposed to the sun; coughing; and progressive weakness are some of the symptoms noted by Prof. Voegtlin.

AUTOPSY FINDINGS.

Body emaciated; central nervous system normal; liver pale; kidneys pale; spleen slightly hemorrhagic; intestines slightly hemorrhagic.

MICROSCOPIC APPEARANCES.

Heart.—Myocardium muscle fibers are much separated; in many areas the transverse striations are not so distinct as normal; no pigmentation is observed, nor is the sarcoplasm granular; a slight degree of congestion is present in both the larger vessels and the intermuscular capillaries.

Lungs.—The aveolar walls are markedly congested, and in some aveoli there are indications that hemorrhages have occurred; the larger vessels are congested, and the surrounding lymphatics contain much blackish pigment—probably foreign carbon.

Liver.—Marked changes have occurred. It is only after some study that one is convinced that the section is taken from the liver. Both the portal and central veins are congested, and in the former large cells (phagocytes?) are seen filled with dark-brown pigment; the intralobular capillaries are congested. The pronounced changes are seen in the liver cells; the typical cords are not seen, but the cells lie scattered without definite arrangement; some are atrophic, others are large; all forms are seen—some angular, others round or oval, and still others irregular in outline. The cytoplasm of many cells is vacuolated. These vacuoles vary in size and number for each cell, in many instances they are larger than the nuclei. They are found in cells near the central vein as well as in the peripheral portions of the lobules. The larger vacuoles are not the typical vacuoles of fatty degeneration and infiltration but suggest hydrops. In many cells the cytoplasm is granular. In many instances the cells normally present surrounding the central veins have disappeared; only a few remain. This section shows pronounced nutritional disturbances. No evidence of infection is observed. (See Fig. 5.)

The description above does not apply to all portions of the liver, as sections were examined where the cells and cords are more normal in appearance, and the disturbances are not so pronounced.

Spleen.—Capsule is thickened; a marked congestion of the spleen pulp is seen; no abnormal accumulation of polymorphonuclears is seen in the pulp; the red blood cells completely surround and break up the pulp cords so that the latter appear as small irregular islets in the red blood cells; the lymphoid tissue surrounding the arteries—Malpighian areas—are reduced in amount. There is also seen a beginning amyloidosis in these areas; however, they react only faintly to methyl violet.

Kidney.—Capsule appears normal; glomeruli for the most part are congested; cells of proximal convoluted tubules are slightly granular, the nuclei

stain normally, the distal ends of these cells are broken and a granular detritis is found in the lumina; this is also true of the epithelial elements of the urinary tubules; the collecting tubules are similar in appearance to the urinary tubules; the interstitial vessels are congested.

Stomach—Fundus.—Superficial epithelium is eroded; this is also true of the cells deeper down in the glands where they are either completely or partially destroyed; the parietal cells stand out very plainly and appear normal, they appear to have resisted the degenerative changes; a slight increase of the cellular elements—round cells and plasma cells—is seen in the mucosa; the muscularis mucosae is normal; the submucosa is slightly congested; marked atrophy of the muscular wall has occurred.

Small intestine—Ileum (?)—Superficial epithelium is eroded; the naked villi project into the lumen, many of which are congested and hemorrhagic; numerous large plasma cells are seen in these naked and eroded villi; in many instances the villi are completely destroyed, ulcers. The goblet cells stain deeply in muchameatein and are well preserved where the epithelium remains intact; the submucosa is atrophic and slightly congested; the muscular coat is very thin.

Colon.—Superficial epithelium is eroded; the goblet cells are well preserved; the interstitial cells of the mucosa are atrophic, a mild congestion is seen in certain areas, no hemorrhage; the submucosa is slightly congested.

Cerebrum.—A mild congestion of both cortex and pia is noted. No other section from nervous system was examined.

Skin.—From region of external canthus, no noticeable changes in various epithelial layers; the connective tissue fibers of dermis and subcutaneous portions are separated—suggesting edema at one time—no congestion, no pigmentation.

SUMMARY.

Gross conditions.—Extreme emaciation; congestion and hemorrhage of gastrointestinal tract and nutritional disturbance in liver and kidney—both large and pale.

Microscopic anatomy.—Congestion of heart and lungs; marked disturbance of liver cells—atrophic, vacuolated, irregularly distributed; spleen extremely congested with beginning amyloidosis of the Malpighian bodies; kidney, slight congestion of all vessels and beginning albuminous degeneration; gastrointestinal tract congested and hemorrhagic.

MONKEY IV.

Fed cottonseed oil, raw eggs, and water, mixed in the form of cakes. Began feeding April 3; monkey then weighed 2,950 grams. There was a progressive loss of weight with a history of diarrhea, weakness. The monkey died July 17; weight 2,275 grams. The animal was paralyzed before death.

AUTOPSY FINDINGS.

Brain congested; cord normal; lungs, spleen, and liver congested; kidneys pale; stomach slightly hemorrhagic; small intestinal wall thin; large intestine slightly hemorrhagic and contains three worms resembling hookworms.

MICROSCOPIC APPEARANCES.

Heart.—This section shows fairly normal heart tissue; the transverse striations are plainly seen; all vessels, however, are filled with blood.

Lungs.—Intensely congested, both in the larger vessels and in capillaries of the alveolar walls; many of the alveoli are filled with œdematous masses; much foreign pigment is also observed in the perivascular lymphatic areas.

Liver.—Extremely congested; resembles nutmeg liver; the intralobular capillaries are so congested that in many areas the chains of liver cells are so broken that the cells have no regularity of position; the cytoplasm of many cells, especially at the periphery of the lobules, are granular, while those nearer the central veins have undergone pronounced cytoplasmic changes. (See Fig. 6.)

Spleen.—Extreme congestion; practically all the pulp area is taken up by red blood cells—only the nuclei of the pulp cells are seen; the Malpighian areas are reduced as a consequence of this extreme congestion; in many of these areas homogeneous masses are beginning to form which resemble amyloid; this, however, does not give a very positive reaction to methyl violet.

Pancreas.—Congested; apparent reduction in the number of islets, cytoplasm of pancreatic cells have undergone degenerative changes.

Kidney.—Congestion of all glomeruli; urinary and collecting tubules show slight disturbance of cytoplasm—granular and broken; all interstitial vessels are congested as well as the large arciform vessels.

Suprarenal.—Congestion, especially of the medulla and the zona reticularis; in certain areas hemorrhages are seen.

Small intestine.—Superficial erosion of epithelium; extreme congestion and hemorrhage of the mucosa; marked congestion of the submucosa; atony of the muscular layer.

Central nervous system.—Sections from the fissure of Rolando show congestion but no alterations in the pyramidal cells. Purkinje's cells in the cerebellum appear normal; many cells in the anterior horns of the dorsal spinal cord show chromatolysis; many are pale and swollen; pronounced congestion of this portion of the cord is also observed—both in the gray and white matter; the cells of spinal ganglia, in many instances, are large and pale; tissues prepared by Pal-Weigert's method show no degenerations in internal capsule, cerebellum, medulla, or cord.

SUMMARY.

Gross conditions.—Emaciation; brain congested; lungs, liver, and spleen congested; stomach and large intestine slightly hemorrhagic; kidneys pale.

Microscopic findings.—Slight congestion of heart; congestion and edema of lungs; extreme congestion and albuminous degeneration of the liver; spleen extremely congested; congestion of kidney, pancreas, suprarenals, and small intestines—the latter extremely congested and hemorrhagic. The central nervous system shows slight alterations in the cells of the cord, both in the anterior horn cells and spinal ganglia, although no tract degenerations are seen.

MONKEY V.

Fed on yellow corn meal and sweet potatoes. Original weight at beginning of feeding, May 5, was 2,500 grams. At time of death, June 27, monkey weighed 1,865 grams. Loss of weight, diarrhea, and a final stupor from which the animal could not be roused mark the chief clinical observations.

AUTOPSY FINDINGS.

Same as monkey No. VII, which died first.

MICROSCOPIC APPEARANCES.

Heart.—Identically same condition as monkey No. VII.

Lungs.—Similar to that of monkey No. VII. Potassium ferrocyanide and hydrochloric acid show that the pigment is not hemosiderin.

Liver.—A mild degree of congestion which includes the central and portal veins and the intralobular capillaries; the congestion is not so intense as that seen in this organ in No. VII. Pigment is not hemosiderin.

Spleen.—Intense congestion and pigmentation with hyalin changes in the Malpighian areas—these are not so intense, however, as seen in No. VII.

Kidney.—This section is much similar to No. VII. The glomeruli are mildly congested; great destruction of the cytological elements of the urinary tubules—especially the convoluted tubules where the cytoplasm is granular, broken, or vacuolated, this condition is seen chiefly under the capsule; marked dilatation of many urinary tubules present a similar picture to the urinary tubules in No. VII so far as the cytoplasmic disturbances are concerned; a mild congestion of all vessels exists.

Stomach—fundus.—In some areas the superficial epithelium at the summits of the glands is eroded, in other areas it is normal; a mild congestion of the mucosa exists throughout; the submucosa is slightly congested; the muscular layer appears normal.

Intestines.—Most pronounced pathological changes are seen in this section. The entire mucosa, with the exception of the very bottoms of the glands, is composed of inflammatory tissue; the most superficial area is composed of necrotic masses and fibrin; below this is a zone of cellular elements—polymorphonuclear, plasma, endothelial, and red blood cells; this is a typical picture of an ulcer; the submucosa is intensely hemorrhagic, congested, and infiltrated with cells; the muscularis mucosæ is not seen; no line of demarcation exists between the mucosa and submucosa; the muscular layer is also congested. This section is so altered that with the ordinary stains it was impossible to determine from which part of the gastro-intestinal tract it had had origin; by use of muchametein, goblet cells were seen in a very few glands at one end of the section; in all likelihood this was taken from the jejunum. (See Fig. 7.)

SUMMARY.

Gross findings.—Similar to Monkey VII; emaciation; congestion of liver and spleen; congestion and hemorrhage of the gastro-intestinal tract.

Microscopic findings.—Degeneration of myocardium; congestion of liver; spleen congested and hyalin changes; kidney cytoplasmic disturbances, degeneration of urinary and collecting tubules; stomach superficial erosions; ulceration, hemorrhage, and congestion of the intestines.

No tissues from the central nervous system were examined.

MONKEY VI.

Fed on a diet of corn meal and sweet potatoes—50 grams of each daily. Began feeding May 5; weight of monkey was then 2,300 grams. The loss of weight was progressive, and on June 3 it weighed 1,580 grams. It died July 5.

AUTOPSY FINDINGS.

Membranes of brain injected; cortex of brain congested and slightly injected; cord normal; kidneys pale; adrenals normal; spleen hemorrhagic; pancreas normal; liver normal; heart pale, firm, systolic; lungs contain patches of black pigment; large intestine hemorrhagic, contains large number of worms.

MICROSCOPIC APPEARANCES.

Heart.—Muscle fibers show some indistinctness of transverse striations; a congestion also occurs.

Lungs.—Extreme congestion of the capillaries of the alveolar walls; perivascular accumulations of round cells; the congestion and lymphoid cells occur only in certain areas; much black pigment is also seen in the perivascular and peribronchial lymphatics—appears to be foreign pigment.

Liver.—Congestion of all vessels including the intralobular capillaries; atrophy of the most centrally placed cells and albuminous degeneration of many cells; no fatty infiltration or pigmentation is seen.

Spleen.—Extreme congestion of all pulp areas; Malpighian bodies reduced in area owing to this congestion, beginning amyloid changes are observed in these bodies which react only faintly to methyl violet.

Pancreas.—Mildly congested; islets of Langerhans do not stand out clearly, nor are they as numerous as in the normal tissue; when seen they are not clearly differentiated from the surrounding pancreatic cells; this same condition has been observed in practically all pancreatic tissues taken from this series of monkeys.

Kidneys.—Capsule normal; glomeruli slightly congested; cytoplasmic disturbances of the cells of the urinary and collecting tubules; many of these cells are granular, others broken, vacuolated—hydrops; practically all interstitial capillaries are congested.

Stomach.—Practically entire mucosa either completely destroyed or substituted with inflammatory tissue; in some areas the fundi of the glands alone remain; in the latter, one sees extreme congestion and hemorrhage; the ulcerous areas possess the usual inflammatory cells; it was essential to use much anæsthetic to determine the nature of this section; the submucosa and muscular layer are intensely congested. (See Fig. 8.)

Intestines.—Sections from this portion of the gastro-intestinal tract show the same conditions as described above for the stomach.

Central nervous system.—Meninges congested; many pyramidal cells in the fissure of Rolando show slight degenerations—such as chromatolysis, paleness, and in some instances slight pigmentation; cells in the anterior horn of the spinal cord, especially in the dorsal region, likewise show retrograde changes, some pale, others vacuolated, others again have completely disappeared; all cells, however, do not show these changes; Pal-Weigert's method shows degenerated fibers in the internal capsule irregularly distributed; also degenerated fibers in all the tracts of the cord; in the cervical region, the extent of degeneration is so great in the column of Burdach that it appears well demarcated from the column of Goll. In the dorsal region, the degenerations have advanced more in the column of Goll, especially in the median line; this is also true in the lumbar enlargement.

SUMMARY.

Gross findings.—Membranes of cortex as well as cortex congested and slightly injected; heart pale and firm; black pigmentation of lungs; spleen hemorrhagic; large intestine hemorrhagic.

Microscopic findings.—Heart practically normal except for indistinctness of transverse striations; lungs extreme congestion; liver congested with cytoplasmic degenerations of liver cells; spleen extreme congestion; pancreas only mildly congested with indistinctness of islets and an apparent reduction in numbers; kidneys albuminous degeneration of urinary tubules and congestion

throughout; stomach and intestines hemorrhagic, congested and ulcerated; central nervous system congestion of meninges; slight degree of degeneration of the pyramidal cells of cortex and the anterior horn cells of the cord; degenerations of fibers in the internal capsule and cord, in the latter especially in the column of Burdach in the cervical region and the column of Goll in the dorsal and lumbar region.

MONKEY VII.

Began feeding yellow corn meal, May 5, 1914. After a history of progressive loss of weight (original weight 2,270 grams), inanition, diarrhea, etc., it died June 28; weight 1,730 grams.

AUTOPSY FINDINGS.

Lungs normal; heart dilated; liver congested; stomach and intestines show hemorrhage; spleen congested; no signs of scurvy; very emaciated body; few worms in intestines; total weight of brain 78.5 grams; cord 3.505 grams.

MICROSCOPIC APPEARANCES.

Heart.—Myocardium—certain areas, especially those fibers near the endocardium, show vacuolization (hydrops) and numerous albuminous granules; the vacuoles surround the nuclei for the most part; the transverse striations are either faintly seen or absent in most of the myocardial fibers. All vessels including the myocardial capillaries are congested. (See Fig. 9.)

Lungs.—Few changes are seen; the alveolar walls are thickened; the peribronchial and perivascular connective tissue contain much brownish, yellowish pigment; this pigment is also seen here and there in the alveolar walls; where blood is present in the larger vessels pigment of the same color is seen either diffuse or in certain cells; only a part of the pigment gives the hemosiderin reaction with potassium ferrocyanide and hydrochloric acid. The largest amount is in all probability hemoglobin precipitated by the formalin used in fixation.

Liver.—This organ is intensely congested, both central veins and the portal veins; the blood contains very much pigment, but as these tissues were fixed in formalin perhaps no pathological significance can be attached to it; the liver capillaries are also congested and as a result the cord cells are thinned and separated from each other; the cords are distorted; the cells nearest to the central veins are most affected; many lobules give characteristic appearance of nutmeg liver.

Spleen.—Intensely congested; the pulp cells are masked by this congestion and the characteristic pigment is seen as described above, which is either within the endothelial leucocytes as granules or free; the spleen is atrophic, as more than the usual number of Malpighian areas are seen; in many of these hyalin changes have occurred in the central arteries; there is also an increase of the connective tissue elements throughout.

Kidney.—Capsule congested; glomeruli are either normal in appearance or slightly congested; the urinary tubules, especially the convoluted tubules, show disturbances of the cytoplasmic elements of the cells; in the cytoplasm are seen vacuoles or reticulations; the ends of the cells forming the lumina are broken and ragged, albuminous granules are also seen; the lumina are wide, both from dilatation and as a consequence of the destruction of the proximal ends of the cells; the cells of the other constituents of both the urinary and collecting tubules show similar changes; considerable congestion is seen in all vessels, the blood of which contains much pigment-hemoglobin.

Suprarenals.—Congestion and hemorrhage are seen in both the medulla and cortex with the characteristic pigment; the medulla is atrophic.

Stomach—fundus.—Mucosa congested; parietal cells in many instances are broken and atrophic; this is also true of the other cells of the fundi of the glands; the mucosæ muscularis is normal; the submucosa is congested; the muscular layers appear normal.

Small intestine—ileum.—In many instances the villi are eroded, some are completely gone, others more than one-half of their lengths; the submucosa is greatly infiltrated with lymph, plasma, and endothelial cells, few leucocytes are also seen, these cell infiltrations come in contact with the lumen-ulcers, the vessels are congested; the muscular layer is atrophic, the fibers of the inner layer are broken and separated from each other.

Large intestine.—Mucosa much similar to that described for small intestine, more polymorpholeucocytes, however, are seen, and in some instances these form small foci; submucosa and muscular layer are normal.

Central nervous system.—A mild congestion of the meninges is seen; this is also true of the cerebral cortex; no changes are observed in the pyramidal cells except that spaces are seen between many cells and the surrounding neuroglia—this, however, may be due to the fixative; Pal-Weigert's method shows little or no degeneration of nerve tracts from this section of the cortex-frontal lobe. Spinal cord, dorsal region—a small area of degenerated fibers is observed macroscopically in the median line of the posterior tract; this area is included within the column of Goll; however, not all the fibers within this area are degenerated; many of the cells of the anterior horn appear swollen and pale, the Nissl's bodies being reduced; the central canal is dilated and filled with a granular detritus. (See Fig. 12.)

SUMMARY.

Gross findings.—Extreme emaciation; congestion of liver and spleen; congestion and hemorrhage of the gastro-intestinal tract.

Microscopic findings.—Degeneration of myocardium; liver extremely congested; spleen congested and hyalin changes; kidney mild degree of albuminous degeneration; suprarenals slightly congested; stomach congestion and erosion of epithelium; small and large intestines congestion of both mucosa and submucosa with erosion of villi, ulcers, atrophy of the muscular layer of the ileum especially; nervous system degeneration of fibers in the tract of Goll.

MONKEY VIII.

Began feeding monkey yellow corn meal on May 5; from then on it began to lose weight, became gradually emaciated and finally died, May 30, from marked inanition.

AUTOPSY FINDINGS.

Moderate increase of fluid in the subdural space; heart flabby; liver red and congested; kidneys pale; adrenals markedly red and congested; the gastro-intestinal tract hemorrhagic, especially was this true of the lower jejunum and colon.

MICROSCOPIC APPEARANCES.

Heart.—Ventricular wall marked congestion of all blood vessels; transverse striations are not so definite as seen in the normal; longitudinal striations are normal in appearance; Van Gieson's stain shows a general increase of collagenic fibers.

Liver.—Marked congestion of both the central and portal veins is seen; the chains of liver cords are broken up into irregular, interrupted chains, some even forming little islets of liver cells—this condition is chiefly due to congestion of capillaries; the cytoplasm of the liver cells is granular; the nuclei as a rule stain more faintly than normal; no pigmentation or fatty degeneration is seen.

Spleen.—The entire pulp is filled with red blood cells; Malpighian corpuscles are reduced in areas as a result of this intense congestion; this is a typical picture of passive congestion.

Pancreas.—Marked congestion of all blood vessels; many islets are very indistinct and difficult to make out from the surrounding acini, as no sharp line of demarcation exists between them. The acini also are congested.

Kidney.—The capsule is congested, loose, and in practically all the sections it is torn and separated from the cortex; the glomeruli as a rule are of normal size, many possess numerous red blood cells—showing a slight stage of congestion. The convoluted tubules are in many instances granular, some show hydrops wherein the entire cell is enlarged and vacuolated; the nuclei as a rule, with the exception of those in vacuolated cells, are normal in their staining reactions. The remaining elements of the renal and collecting tubules are apparently normal. The lumina of the latter in many instances contain a granular detritus. There is a general presence of red blood cells in all the vascular elements, indicating a slight degree of congestion.

Certain focal areas are seen wherein the cytoplasm is broken, stains faintly, and the nuclei fail to stain. These areas may include both glomeruli and tubules—areas of focal necrosis. The presence of these focal necrotic areas, mild congestion, and the granular condition of the proximal tubules indicate a toxic disturbance of the kidney.

Suprarenal.—The capsule is congested; marked congestion and hemorrhage is seen in the cortical substance, especially in the zona fasciculata; the cells of this zone are much more vacuolated than in the normal, showing an increase of lipoid substances; much pigment is seen in the terminal cells of the zona reticularis—this, however, can not be considered as abnormal in amount; the sinuses of the medullary portion are filled with red blood cells; no alterations appear in the chromaffin cells.

The marked lesions here are the hemorrhages and congestions seen in the zona fasciculata, the cytoplasm of these cells being very granular.

Stomach—pyloric region.—Slight congestion of the vessels of the mucosa is practically the only abnormality found. Some vessels in the submucosa and muscular layer are also congested. The epithelial cells are normal; Fundus region, same as pyloric.

Small intestine—ileum.—Epithelium on tips of villi eroded; remainder of epithelial cells of glands are normal; mucosa is congested and many polymorphonuclear leucocytes are seen, however not to such an extent as is seen in the section from the colon; the muscularis mucosae is intact throughout; the submucosa is atrophic and congested; atrophy and thinning of the muscular wall is also observed.

Colon.—Superficial epithelium eroded; extreme congestion and hemorrhage of mucosa; in many instances red blood cells are seen in the lumina of the gland tubules; many polymorphonuclear leucocytes are also seen in the mucosa; these have a tendency to accumulate into foci which are in free contact with the lumen—ulcers; goblet cells stain only faintly in mucicarmatein.

Nervous system.—Small pieces from the following tissues were prepared for microscopic study by Pal-Weigert's method and the method for demonstrating Nissl bodies: Cerebrum, fissure of Rolando and internal capsule; cerebellum,

vermis; cord, cervical and lumbar enlargement; vagus nerve; sympathetic trunk with ganglia; spinal ganglion. Consequently it was possible to both the cells and axones with their myelin sheaths.

Pronounced changes are seen in the column of Burdach in the cervical enlargement, where practically all the myelin sheaths are in stage of degeneration; this degeneration is sharply demarcated from the column of Goll. Cells in the spinal ganglia have undergone chromatolysis; there is also some increase of the pericellular connective tissue elements. (See Fig. 11.)

SUMMARY.

Gross findings.—Moderate increase of cerebrospinal fluid; heart flaccid; liver congested; kidneys pale; adrenals markedly congested; gastrointestinal tract hemorrhagic, especially in lower part.

Microscopic findings.—Heart congested and muscles have undergone progressive changes; liver congested and cells have undergone pathologic changes; spleen intensely congested; pancreas congested; kidney slight congestion; disturbance of the cells of the proximal convoluted tubules, focal necrotic changes; suprarenals intensely congested and hemorrhagic; gastrointestinal tract congested, hemorrhagic, and atrophic, each increasing in degree as the lower end is approached; spinal cord degeneration of Burdach's column, chromatolysis of spinal ganglia cells.

MONKEY IX.

Fed on fresh carrots exclusively for five months and three weeks. During this time it lost considerable body weight and showed a persistent diarrhea after first weeks of the feeding.

AUTOPSY FINDINGS.

Extremely emaciated; skull and spine bones hard (not brittle); cord normal; brain normal; heart congested; no excessive fluid, right heart not dilated; lungs normal; liver congested; spleen very small, congested; kidney congested; adrenals normal; abdominal lymph glands enlarged; stomach fundus extremely hemorrhagic; large intestine normal, contains a few worms resembling house flies; duodenum slightly hemorrhagic; ileum slightly hemorrhagic; testes not loose; no hemorrhages in skeletal muscles; no signs of scurvy; femurs contain red marrow.

MICROSCOPIC APPEARANCES.

Heart.—Myocardium, muscle fibers are shrunken, no striations are seen, sarcoplasm is granular and pigmented, the pigment, however, is not hemosiderin; the nuclei stain faintly but appear prominent owing to the atrophic cells; vessels are congested.

Lungs.—Contain foci of lymphoid cell infiltrations but no true tubercles are seen; numerous areas of consolidation are also seen in which the alveolar walls can still be made out; the alveoli in these areas are filled with large round hyperplastic endothelial cells. Considerable carbon pigment is seen surrounding the bronchioli. The capillaries are intensely congested.

Liver.—Intensely congested. The chains of liver cells are broken as a result of this congestion. Many of the liver cells, especially those in close proximity to the central veins, are atrophic; others again are vacuolated, fatty changes.

Spleen.—The capsule and trabeculae are especially prominent, the lymphoid areas appearing as minute points. The pulp is extremely congested.

large endothelial cells are seen throughout this pulp which are filled with red blood cells and pigment; the latter reacts with potassium ferrocyanide and hydrochloric acid forming a deep blue color—hemosiderin.

Kidneys.—A mild congestion is observed, otherwise no pathological changes are seen.

Stomach.—The mucosa and submucosa in this section are congested. The epithelium of the proximal end of the gastric glands are atrophic and in some areas completely eroded. An increase in the connective tissue of the mucosa is noted. In this mucosa few parasitic eggs, granular, and oval in outline, are seen.

Small intestine—jejunum.—Intense congestion of both the mucosa and submucosa are present. In some areas the mucosa is completely gone and the muscularis mucosae is exposed.

Colon.—This structure is intensely congested throughout. Parasitic eggs similar to those in the stomach are seen in the mucosa.

Pancreas.—Slightly congested; many of the acini cells are vacuolated; the islet cells appear normal.

Cerebrum.—The cortex and pia are mildly congested; the former possess numerous vacuoles (edematous)—this latter condition was especially prominent in the formalin fixed tissue; in this tissue the pyramidal cells appeared somewhat shrunken and spaces are seen between them and the ground substance of the cortex. In tissue fixed in alcohol these cells appear somewhat swollen and chromatolysis has occurred. Many pyramidal cells show eccentric or peripheral nuclei. (See Fig. 13.)

Cerebellum.—The Purkinje's cells stain faintly; an interesting condition here is that these cells are completely embedded within the molecular layer.

Spinal cord.—Dorsal and lumbar region. As a rule the anterior motor horn-cells (alcohol fixation) show chromatolysis of Nissl's granules; many are slightly vacuolated (fatty degeneration). In formalin fixed tissue these cells appear shrunken, the nuclei, instead of being vesicular in form, stain deeply and solidly throughout; between the cells and surrounding matrix, spaces are seen. Evidences of degeneration of the tracts are present. This degeneration is more or less diffuse throughout the white matter. Unfortunately none of this tissue was prepared by the Pal-Weigert's method, consequently it was impossible to accurately determine the degree and extent of the degeneration; however, it is suggestive of the appearance of similar tissue in Monkey I. No degeneration was noted in the vagus or femoral nerves. (See Fig. 14.)

SUMMARY.

Gross conditions.—Extreme emaciation; heart congested; liver congested; spleen atrophic; kidney congested; abdominal lymph glands enlarged; stomach and small intestines hemorrhagic.

Microscopic anatomy.—Heart congested, loss of transverse striations, muscle cells atrophic and granular; lungs congested, alveoli filled with red blood cells and endothelial cells; liver intensely congested with broken cell chains, cells atrophic and vacuolated; spleen extremely congested and pigmented, hemosiderosis; stomach, small intestines, and colon are congested and ulcerated; central nervous system, chromatolysis of nerve cells and diffuse degeneration in tracts.

SUMMARY OF CELLULAR CHANGES FOUND IN MONKEYS.

Autopsy findings.—Various degrees of emaciation, from mild to extreme; heart pale, firm; lungs congested, pigmented; liver large,

pale, congested; spleen dark, congested, atrophic; kidney large, pale; pancreas hemorrhagic; retroperitoneal lymph glands enlarged; gastrointestinal tract congested, hemorrhagic, ulcerated, muscular wall atrophic; brain congested; meninges congested; increase of cerebrospinal fluid.

Microscopic.—Heart loss of striations, albuminous degeneration, hydropic degeneration, atrophy of muscle cells; lungs mild to extreme congestion, oedematous, herzfehlerzellen; liver congested, cirrhosis, albuminous degeneration, fatty degeneration, hydropic degeneration, atrophy; spleen intensely congested, pigmented-hemosiderosis, amyloidosis, hyalin changes, proliferation of endothelial cells of pulp which contains congested red blood cells and pigment, reduction of Malpighian areas; pancreas congestion, indistinctness, and apparent disappearance of islets; kidney congestion, albuminous degeneration, focal necrosis; suprarenals slightly congested; gastrointestinal tract congestion of all layers, hemorrhagic, ulcerated, atrophic muscular walls, superficial erosions of epithelium; central nervous system, cerebrum, congestion of cortex; pyramidal cells chromatolysis, peripheral arrangement of nuclei, pigmentation; degeneration of fibers in internal capsule; spinal cord degeneration of Burdach's column in cervical region; dorsal region degeneration of Goll's column, diffuse degeneration in other tracts; anterior horn and spinal ganglial cells chromatolysis, swollen; meninges congested.

2. WHITE RATS, SERIES I.—CELLULAR CHANGES RESULTING FROM CORN-OIL CAKE DIETS.

The following statements regarding the diet, the subsequent effect of the diet, and the autopsy finding are summarized from Prof. Voegtlin's notes.

The diet in each instance was composed of various grades of corn-oil cake. In the majority of cases there was much loss of weight before the animals were finally necropsied. In some cases this loss was not progressive, but fluctuations occurred from day to day.

The tissues were obtained in a very fresh condition as the animals were chloroformed. Tissues were fixed in formalin.

RAT I. SERIES I.

AUTOPSY FINDINGS.

Lungs hemorrhagic; spleen dark; liver congested; kidneys congested.

MICROSCOPIC APPEARANCES.

Lungs.—Alveolar walls, thickened and congested; some alveoli show edema; the walls possess much blackish and brownish-black pigment; the larger vessels are also congested; large areas of lymphoid cell infiltrations are seen.

Liver.—A mild degree of congestion is seen in both the central and portal veins; this congestion is also seen in many of the intralobular capillaries. No alterations, however, are noted in the liver cells. The cells contain much hemosiderin.

Kidneys.—Glomeruli are normal in appearance; the epithelium of the urinary tubules are as a rule normal, in certain areas, however, many tubules show broken and granular epithelial cells; the collecting tubules show no alterations; a mild degree of congestion is seen in many of the interstitial vessels.

Spleen.—The pulp areas are moderately congested throughout; the pulp cells as a rule are filled with brownish-black pigment granules; considerable atrophy of the pulp substance has occurred, and as a consequence the Malpighian areas appear larger and more numerous than normal. The pigment granules react with potassium ferrocyanide and hydrochloric acid and consequently are hemosiderin. (See Fig. 10.)

RAT II, SERIES I.

AUTOPSY FINDINGS.

Lungs normal; spleen normal; kidneys congested; liver congested.

MICROSCOPIC APPEARANCES.

Lungs.—Much thickening of the alveolar walls are noted; in many areas there is complete consolidation; the latter areas are made up of new connective tissue cells, round cells, and many cells which contain brownish black pigment; a mild degree of congestion exists throughout.

Liver.—A much more pronounced congestion is noted here than in this organ of Rat I; the congestion is especially marked in the intralobular capillaries; the liver cells show considerable alterations—chiefly a granular change has occurred in these cells, many are atrophic.

Spleen.—The section shows much alteration from the normal structure of the spleen; it is atrophic; the trabeculae are very prominent; the Malpighian areas do not stand out prominently, but are small and gradually fused with the pulp cells. Evidently there has been proliferation of the latter with a pronounced decrease of the lymph cells; numerous endothelial cells contain pigment granules.

Kidneys.—A mild granular condition of the urinary tubules, especially the convoluted tubules—otherwise the section does not show any alterations; a mild degree of congestion is observed, but not to such an extent as seen in this tissue in Rat I.

RAT III, SERIES I.

AUTOPSY FINDINGS.

Lungs hemorrhagic; spleen dark; kidneys congested; liver dark; intestines congested.

MICROSCOPIC APPEARANCES.

Lungs.—Thickened alveolar walls; pigmentation and congestion are the changes seen here; this section resembles a similar section taken from Rat I. The characteristic pigment is present which is composed of two kinds: (1) Pigment which reacts readily to potassium ferrocyanide and hydrochloric acid—hemosiderin and is intracellular; (2) pigment which is both intra and extracellular, chiefly the latter, and is in all likelihood precipitated hemoglobin

as the tissue was fixed in formaline. Both pigments are seen in the same cells. A black pigment (carbon?) is also seen in many of the perivascular and peribronchial lymph spaces.

Liver.—This section resembles a similar section taken from Rat I; a mild degree of congestion and cytoplasmic disturbances such as granules and vacuoles are the alterations observed.

Spleen.—This tissue is similar to that seen in Rat I; the congestion and pigmentation are the striking features.

Kidneys.—Many of the glomeruli are vacuolated—fatty infiltration; cytoplasm of urinary tubules, especially convoluted tubules, is much broken, granular, vacuolated, and reticulated—showing albuminous degeneration; this is also true for the collecting tubules; the arcuate vessels are filled with blood.

RAT IV, SERIES I.

AUTOPSY FINDINGS.

Lungs hemorrhagic; liver congested; small intestine congested; right kidney congested; left kidney substance transformed into large tumor, 2.5 cm. diameter.

MICROSCOPIC APPEARANCES.

Lungs.—Extreme congestion; alveolar walls thickened; many areas of total consolidation; extreme pigmentation throughout; large areas of lymph cell infiltration; alveoli have lost normal structure; majority appear round, as if they had contained fluid.

Liver.—Congestion of central and portal veins; the intralobular capillaries are also congested; liver cells show numerous albuminous granules; many are atrophic.

Spleen.—Very congested; pulp contains numerous pigmented cells, similar to Rat I; the Malpighian bodies are somewhat atrophic.

Kidneys.—Extremely congested; the usual albuminous degeneration is observed in the epithelium of the urinary tubules, especially the convoluted portions; many glomeruli are filled with red blood cells.

Tumor mass.—This occupied the position of the left kidney; it is composed chiefly of cells whose cytoplasm stains very faintly; the cytoplasm appears vacuolated or reticulated. In some areas these cells are grouped into islets of varying sizes, being surrounded by connective tissue. Vessels in these connective-tissue septa are congested. Congestion occurs throughout the tissue. This tumor resembles hypernephroma.

RAT V, SERIES I.

AUTOPSY FINDINGS.

Lungs hemorrhagic; liver congested; kidneys congested; spleen congested; intestines congested and contain bloody fluid.

MICROSCOPIC APPEARANCES.

Lungs.—Alveolar walls thickened and congested; the characteristic pigmentation is present in the endothelial cells; many alveoli are edematous, others enlarged and rounded as if previously filled with fluid; in fact, no normal alveoli are seen; areas of complete consolidation are also noted; areas of lymph cell infiltrations are present.

Liver.—A mild degree of congestion is noted in both the central and portal veins; the congestion in the intralobular capillaries is not so marked as in the sections already described; some liver cells are granular but not to such a degree as observed in other sections.

Spleen.—Pigmentation of the pulp cells is the most characteristic picture in this section. The pigment is intracellular and is composed of hemosiderin, as it reacts readily to potassium ferrocyanide and hydrochloric acid; other non-reacting pigments—within the endothelial pulp cells; although much congestion is present, it is not present to such an extreme degree as observed in similar tissue from other animals.

Kidneys.—Appear more normal than others examined—only a slight granulation is observed in cells of convoluted tubules. Accessory suprarenal gland tissue is observed near papilla.

RAT VI, SERIES I.

AUTOPSY FINDINGS.

Lungs hemorrhagic; liver congested; spleen congested; kidneys congested; small intestine congested.

MICROSCOPIC APPEARANCES.

Lungs.—Identically the same as seen in Rat V—congestion, consolidation, pigmentation, edema and thickened alveolar walls.

Liver.—Congestion of both central and portal veins; in many areas there is also seen marked congestion of the intralobular capillaries; a slight diffuse albuminous granular degeneration is also noted.

Spleen.—The typical pigmentation is observed in the pulp cells; an apparent hyperplasia of pulp cells has occurred; numerous blood cells are seen in this pulp; many vessels—central arteries in the Malpighian bodies—appear to have undergone hyaline changes.

Kidneys.—Only a mild degree of congestion is observed; in certain areas pigment is seen, but it is hemoglobin and not hemosiderin; the parenchyma shows a slight degree of cytoplasmic disintegration.

RAT VII, SERIES I.

AUTOPSY FINDINGS.

Lungs hemorrhagic; spleen dark; kidneys congested; small intestine congested.

MICROSCOPIC APPEARANCES.

Lungs.—Extreme thickening of alveolar walls; consolidated areas; much pigmentation; large areas of lymph cell infiltration surrounding some of the bronchii; extreme congestion.

Liver.—A moderate degree of congestion of the central and portal veins; also a slight congestion of capillaries. No alterations were observed in the liver cells.

Spleen.—Typical pigmentation.

Kidneys.—The usual picture of granular cytoplasm of the cells of the urinary tubules and a moderate degree of congestion is observed.

Intestines.—Entire mucosa and submucosa completely absent in certain areas of this section; the former layers occupied by fibrin; the latter extends to the muscular layer.

RAT VIII, SERIES I.

AUTOPSY FINDINGS.

Lungs hemorrhagic; liver dark; spleen dark; kidneys congested; small intestine congested.

MICROSCOPIC APPEARANCES.

Lungs.—Characteristic picture of thickened alveolar walls, with congestion and extreme pigmentation; alveoli enlarged and irregular in outline; the pigmentation is practically all precipitated hemoglobin.

Liver.—The typical congestion is present; the intralobular capillaries are much more congested here than in many of the other livers observed; the resultant atrophy and granulation of the liver cells, especially those in close proximity to the central veins, are observed; many cells are pigmented; sections treated with potassium ferrocyanide and hydrochloric acid show that the pigment is chiefly hemoglobin and not hemosiderin; in many cells, however, the latter is found; many liver cells appear diffuse blue after this treatment.

Kidneys.—Albuminous degeneration—broken epithelial cells, granular cells—are seen in the various urinary tubules; a mild degree of congestion is also noted.

Intestine.—Superficial epithelium eroded; lumen filled with cells; these cells are—many polynuclear, others with atypical nuclei of many forms; the cells are in all likelihood granulation tissue; owing to the contraction of the muscular layers, the granulation cells appear to fill the entire lumen; the epithelial cells in the fundi of the crypts appear normal; the submucosa and muscular layers are normal in appearance. In other sections this granulation tissue has replaced entire glands.

RAT IX, SERIES I.

AUTOPSY FINDINGS.

Lungs normal; heart normal; liver dark; spleen dark; kidneys congested; small intestine hemorrhagic.

MICROSCOPIC APPEARANCES.

Lungs.—Tissue extremely congested; in some areas red blood cells are seen in the alveoli; all alveolar walls are thickened as a result of this congestion; the characteristic pigmentation is present; the alveoli are distorted and walls broken.

Liver.—Congestion of central and portal veins; mild congestion of intralobular capillaries; pigmentation of many liver cells, also granular degeneration of others.

Spleen.—Typical congestion and pigmentation of the pulp; in many instances this pigmentation can be traced into the Malpighian bodies. The pigment consists of both hemosiderin and hemoglobin. The former is abundant.

Kidneys.—Congestion of all glomeruli and interstitial capillaries; cytoplasm of cells of urinary tubules granular and broken.

RAT X, SERIES I.

AUTOPSY FINDINGS.

Lungs normal; heart congested; liver dark; spleen dark; kidneys congested; nothing abnormal in gastro-intestinal tract.

MICROSCOPIC APPEARANCES.

Heart.—Muscle fibers pale, stain faintly, transverse striations not seen; the sarcoplasm is very granular.

Lungs.—Slight congestion and the characteristic pigmentation, otherwise tissue appears normal.

Spleen.—Pigmentation and congestion of the pulp.

Kidneys.—Characteristic granular degeneration in the cells of the urinary tubules.

SUMMARY OF CELLULAR CHANGES OCCURRING IN WHITE RATS, SERIES I.

Lungs.—Extreme congestion and in some cases edema and hemorrhage; extreme pigmentation, much of which is hemosiderin and consequently a vital process; the alveolar walls are thickened as a result both of congestion and interstitial cellular growth; in many instances the proliferation and congestion has resulted in complete compaction of large areas. Lymph cell infiltrations, surrounding the larger vessels and bronchi, are much greater than are seen in normal rats.

Heart.—In only one case was the heart preserved, this stains but faintly; the transverse striations have completely disappeared; the sarcoplasm is granular.

Liver.—In every instance there is seen congestion of the central and portal veins; in most cases the intralobular capillaries are congested—the degree of congestion varying with different animals—in some cases it approaches the nutmeg type; depending upon the degree of congestion, alterations are observed in the liver cells; where the intralobular capillary congestion is extreme, there is seen atrophy of liver cells, granular changes in the cytoplasm, albuminous degeneration; many cells are pigmented—hemosiderin as well as hemoglobin.

As a rule no fatty infiltration is seen.

Spleen.—Shows extreme congestion and pigmentation of the pulp substance; the pulp cells in every instance are practically filled with hemosiderin granules; this is readily differentiated from the precipitated hemoglobin by potassium ferrocyanide and hydrochloric acid. In many cases there has been an active proliferation of the pulp substance and as a consequence the Malpighian bodies are much decreased in size—in some instances only a few lymphoid cells remain.

Kidneys.—A moderate degree of congestion is generally seen; in practically every instance cytoplasmic disturbances have occurred in the epithelium of both the urinary and collecting tubules; the most pronounced disturbances are seen in the convoluted tubules; these alterations are granular cytoplasm and broken or eroded epithelium in which the proximal ends of the cells have completely disappeared; other changes are vacuolations and reticulations (hydrops).

Intestines.—Only in Rats VII and VIII was this tissue preserved. Both show erosion of the epithelium and evidences of an active pro-

liferation of the connective tissue cells of the mucosa; in VIII areas are seen where the entire glands are replaced by this granulation tissue and fibrin, ulcers.

3. WHITE RATS, SERIES II.—TISSUE ALTERATIONS RESULTING FROM STARVATION.¹

Series II (three rats) shows the changes that the tissues undergo as a result of starvation-withholding of foods. That the previous diets of bread and milk, before fasting was begun, did not affect the tissues is seen in the report of the Normal Rat. In a rat whose diet consisted solely of cracked corn only slight alterations are observed. Reports of the latter two rats will precede that of Series II.

NORMAL RAT.

Fed on bread and milk; age 2½ months; is in good condition; killed by chloroform; born of mother also fed on bread and milk.

AUTOPSY.

Everything normal.

Tissues from the lungs, liver, spleen, and kidneys were fixed in both Zenker's solution and formalin. All proved to be normal and were frequently used for comparisons with other tissues.

FULL-GROWN RAT.

Fed on cracked corn for 3½ months; age 7 months; killed by chloroform; is emaciated, otherwise normal.

AUTOPSY.

Heart and lungs normal; liver slightly congested; spleen normal; kidney mottled, contracted, and red; pyloric part of stomach hyperaemic; intestines normal; central nervous system normal.

MICROSCOPIC APPEARANCES.

Lungs.—Show congestion, lymphoid cell infiltration; many alveolar walls thickened.

Liver.—Slightly congested, the liver cells are somewhat granular.

Spleen.—Slightly pigmented, however, this is hemoglobin, it does not react to Perl's test.

Kidney.—Slightly congested.

RAT I, SERIES II.

Fed on milk and wheat bread from September 18, 1914, to January 2, 1915. No more food allowed. Water given. Body weight, 210 gm. January 19, dead at 2 p. m. Weight, 108 gm.

¹ The starving rats were kept in glass jars containing sawdust. It is not excluded that these animals ate some sawdust.

MICROSCOPIC APPEARANCES.

Heart.—Transverse striations indistinct, intense congestion of all blood vessels.

Lungs.—Extremely congested, the alveolar walls bulge out into the sacs as a consequence of the congested tortuous capillaries.

Liver.—Extremely congested; only the peripheral cells of the lobules persist; those cells located centrally have disappeared; as the cord of cells is followed from the peripheral end to the center of the lobule, they become more and more vacuolated, fatty degeneration, then atrophic, and finally disappear.

Spleen.—The typical picture of the entire series is seen here—the reduction of the lymph areas and extreme congestion of the pulp, together with numerous large endothelial cells filled with red blood cells and pigment. The later, however, is chiefly hemoglobin, although hemosiderin is present.

Kidneys.—Extreme congestion of all vessels. The cells of the urinary tubules are swollen; the cytoplasm is granular and stains faintly. Pigment is present, but it is hemoglobin and not hemosiderin.

Esophagus and cardiac end of stomach.—Congestion of submucosa.

Central nervous system.—Sections from the cerebrum did not show any pronounced changes; large Betz cells were not seen in this section. The cord was vacuolated throughout, suggesting extreme edema. The anterior horn cells presented different forms of nuclei; some were large and vesicular, others again were small and the chromatin filled the entire nucleus. The cytoplasm suggested that chromatolysis had occurred but, as this tissue was fixed in formalin, the degree of chromatolysis could not be as definitely ascertained as could have been done in other fixations—alcohol. Evidence also was present which suggested degeneration of the superficial portions of the posterior tract. Unfortunately no tissues were prepared by the Pal-Weigert method.

SUMMARY.

Extreme congestion of both thoracic and abdominal organs; edema and apparent degeneration of tracts and cells in the cord.

RAT II, SERIES II.

Fed on milk and wheat bread from September 18, 1914, to January 2, 1915. No more food allowed after latter date. Water given. Body weight, 223 gm. January 11, 1 p. m., convulsions, marked hyperexcitability. January 15, found dead at 8 a. m. Weight, 112 gm.

MICROSCOPIC APPEARANCES.

Heart.—No transverse striations seen; sarcoplasm swollen and granular; no pigmentation observed.

Lungs.—Alveolar capillaries and all vessels intensely congested and thickened; many alveolar sacs are filled with blood cells.

Liver.—Liver is moderately congested; fine pin-point areas of lymphoid cell infiltrations are seen throughout the section; cytoplasm of liver cells is somewhat granular.

Spleen.—The congestion of the pulp is not so pronounced as in this organ in Rat I, although congestion occurs here. The Malpighian areas are encroached upon by the congested pulp, which contains numerous enlarged endothelial cells.

Kidneys.—Extreme congestion of all blood vessels; the glomeruli and interstitial capillaries are intensely congested. The cells of the urinary and collecting tubules are swollen, the cytoplasm is granular.

Stomach.—No pathological changes are observed.

Central nervous system.—Cerebrum is congested, the vessels of both the pia and cortex are distended with blood; no changes are observed in the nerve cells.

Cord.—The cells of the anterior horn are large—apparently swollen—and chromatolysis has occurred. Many large vacuoles are present in both the gray and white matter. As described elsewhere in other sections, the nuclei of the anterior horn cells are variable—some are large and vesicular, others, again, are comparatively small and stain solidly throughout. An apparent diffuse degeneration of tracts has occurred. The cord is intensely congested.

SUMMARY.

Pronounced congestion and cellular changes in practically all the thoracic and abdominal viscera; congestion, chromatolysis, and degeneration of tracts in the central nervous system.

RAT III, SERIES II.

Fed on milk and wheat bread from September 18, 1914, to January 2, 1915. No more food allowed after this date. Water given. Body weight 102 gm. Died at 4.45 p. m., January 10. Weight 58 gm. Stomach empty; bloody fluid in small intestine.

MICROSCOPIC APPEARANCES.

Heart.—Striations indistinct; sarcoplasm granular. In some cells vacuoles are seen—fatty degeneration. All vessels are congested.

Lungs.—Intense congestion of the alveolar walls which are much thickened.

Liver.—Both central and portal veins intensely congested; this congestion extends between the liver cords; the cytoplasm of the liver cells is to some degree granular and atrophic, especially in those cells in closest proximity to the central veins; many of the latter are vacuolated—fatty infiltration.

Pancreas.—Appears normal.

Spleen.—The capsule is thickened; the Malpighian areas are reduced in size. Throughout the pulp, numerous red blood cells are seen showing marked passive congestion; much hemosiderin is present and numerous red blood cells are found within large swollen endothelial cells.

Esophagus and stomach.—The submucosa of the cardiac end of the stomach intensely congested. In that region of the stomach which contains gastric glands, complete erosion of the epithelium had occurred; only the connective tissue elements of the mucosa remains, the surface of which is covered with fibrin. Between the crypts formed by the connective tissue mucosa, elongated threads and plugs of mucin still persist. The submucosa and mucosa, likewise, are necrotic in certain areas; one area shows a typical ulcer formation. (See Figs. 15 and 16.)

Kidney.—Congestion occurs in all vessels; the cytoplasm of the urinary tubules in particular stain faintly; the glomeruli appear normal.

Skin.—A section from this tissue is normal in appearance, except for a small area of pigment the nature of which was not determined.

Cerebrum.—Pia is slightly congested, spaces occur between the pyramidal cells and the surrounding cortex; this may be due, however, to the fixation.

Chromatolysis has occurred in many of these cells. An invading tumor from the meninges is seen in one area, which is very cellular and in nature suggests sarcoma.

Spinal cord.—All vessels are congested.

SUMMARY.

Congestion of all organs of the thoracic and abdominal viscera with evidences of nutritional disturbances of the parenchyma of these organs; in the central nervous system congestion occurs and the pyramidal cells of the cortex have undergone chromatolysis.

SUMMARY OF CHANGES IN SECOND SERIES OF WHITE RATS.

In making a complete summary of the changes observed in the White Rat, Series II, it will be noted that these animals had lost approximately 50 per cent of their weights in periods ranging from 8 to 17 days. The microscopic changes are as follows: Heart—albuminous degeneration, congestion; lungs—extreme congestion and hemorrhages, in many instances the alveoli are filled with blood; liver—extreme congestion, cloudy swelling, fatty degeneration, partial to total atrophy of liver cells; spleen—prominent capsule, trabeculae, appear very much thickened, extreme congestion, reduction in areas to complete disappearance of Malpighian follicles as a result of this congestion and hyperplasia of endothelial cells, the latter are filled with red blood cells and pigment hemoglobin and hemosiderin; kidneys—extreme congestion of all vessels both of the glomeruli and intertubular capillaries, albuminous degeneration; gastrointestinal tract—congestion, hemorrhage, erosion of epithelium, ulcerations, atrophy; central nervous system—pia congested; cerebrum congested, pyramidal cells show chromatolysis and are swollen; cord congested, edematous, anterior horn cells swollen, chromatolysis, nuclear disturbances, degeneration of nerve fibers in the posterior tract, slight and diffuse degenerations in other tracts.

When Series II is compared with Series I one finds that the pathological changes in both are very similar. In Series I much more hemosiderin is found. while fatty degeneration, as seen in the liver, is less frequent. In Series II the congestion is far more pronounced.

4. PIGS—DIETS OF CORN-OIL CAKES.

FIG NO. 1.

Fed on corn-oil cake meal for eight months. Marked ataxia appeared after some time. Animal became emaciated and refused part of food. Extract of autolyzed yeast was without effect on the condition of the animal, which died after having been completely paralyzed.

AUTOPSY FINDINGS.

Emaciated body; skull very brittle, spongy, but not red; brain soft; cord soft; lungs, right lung shows some edematous patches, left lung normal; heart in systole, no dilatation of right heart, very little clear pericardial fluid; liver congested; gall bladder filled with pale bile; spleen small, dark red, and congested; pancreas normal; kidney small; stomach fundus hemorrhagic; duodenum slightly injected; ileum hemorrhagic; large intestine normal, filled with fluid fecal matter; ribs, marrow intensely red; some of the teeth are loose (scurvy?); femur, pale marrow. "This animal showed some signs of scurvy," remarks Prof. Voegtlin, "although they were of very doubtful nature. Perhaps a histological examination will throw some light on this question."

MICROSCOPICAL EXAMINATION.

Heart.—Transverse striations are indistinct, sarcoplasm is granular, the individual fibers are widely separated, congestion of blood vessels. The sympathetic nerve cells seen in this section stain very faintly and appear swollen. No pigmentation is present.

Lungs.—Alveolar walls are thickened and congested; many alveoli contain numerous large round cells with one or more nuclei, the cytoplasm of these cells is prominent and stains deeply with eosin, some of these contain red blood cells. These cells are undoubtedly endothelial cells of the alveolar walls. Certain areas show infiltration of polymorphonuclear leucocytes around the bronchioles-bronchiopneumonia. Marked congestion occurs throughout.

Thymus.—Somewhat congested; one area is seen in which an irregular mass of deep brown pigment and shadows of red-blood cells are present. The pigment gives only a slight hemosiderin reaction.

Liver.—Intense congestion exists. The central veins are especially congested; this congestion extends into the lobules between the liver chains; many of the latter are broken; those cells in closest proximity to the central veins are atrophic and the cytoplasm is granular.

Spleen.—Extreme atrophy of the cellular elements and hypertrophy of the connective tissue substance—the capsule and trabeculae are much thickened. The Malpighian areas are reduced to minute points. The pulp is composed chiefly of large endothelial cells filled with red blood cells and pigment—hemosiderin. (See Figs. 17 and 18.)

Kidney.—Glomeruli are intensely congested; this is true of all the vessels.

Stomach.—Submucosa is slightly congested, otherwise the section is normal.

Duodenum.—A small ulcer is present, the surface epithelium is for the most part eroded and a hypertrophy of the connective tissue elements of the mucosa has taken place. A marked congestion is seen throughout the section.

Jejunum.—Mucosa and submucosa are intensely congested. The muscular wall is very thin. In many areas complete erosion of the superficial epithelium has occurred.

Bone.—An apparent increase of the connective tissue elements of the marrow has occurred.

Nervous system.—Cerebrum—In formalin fixed tissue, the pyramidal cells are shrunken and spaces exist between them and the matrix. This same picture is seen in the alcohol-fixed tissue although the cells are not so much shrunken; Nissl's granules are very indistinct—an apparent chromatolysis has occurred. In some of these cells, minute vacuoles are seen. Larger vacuoles are seen in the white substance.

Cerebellum—Purkinje cells are faintly stained and are deeply embedded in molecular layer.

Medulla—No pathological changes are observed.

Cord, cervical—No changes are observed in the anterior horn cells.

Cord, dorsal—Many of the anterior horn cells appear swollen, are pale, and chromatolysis has occurred. Interesting in connection with this reaction are the large vesicular nuclei. In many sections of formalin fixation so far studied the nuclei stain deeply and solidly throughout, similar to the nuclei of many epithelial cells. It was surmised that this condition was due to the action of the fixative—formalin. However, in this section—fixed in formalin—the nuclei are large and vesicular. Whether these changes in the chromatin of the nuclei as seen in various sections of this series are due to the fixatives or are pathological changes has not been determined.

The white matter contains numerous vacuoles indicative of edema. These vacuoles are seen in the horns in alcohol fixed tissue. A suggestive degeneration more or less diffuse has occurred. No Pal-Weigert's preparations were made, however, so this could not be accurately determined from the sections at hand.

Spinal ganglion.—These cells stain more faintly than the normal.

Sciatic nerve.—Normal so far as could be determined by this section.

SUMMARY.

Gross appearances.—Emaciated body; skull brittle; brain and cord soft; right lung edematous; liver congested; spleen small and congested; gastrointestinal tract congested and hemorrhagic.

Microscopic findings.—Heart congested, transverse striations absent, sympathetic nerve cells in heart swollen, and stain faintly; lungs congested; thymus congested, pigmented; liver extremely congested; spleen atrophic, pigmented hemosiderin; kidney congested; gastrointestinal tract congested, superficial epithelia eroded; ulcer in duodenum; central nervous system more or less chromatolysis of pyramidal and anterior motor horn cells with suggestive changes in the nuclei of the anterior horn cells, no pigmentation. Apparently degeneration of spinal cord tracts has occurred but unfortunately, due to fixatives used, this could not be accurately determined.

FIG NO. III.

Initial weight 29 pounds; was fed corn-oil cake meal beginning with March 10; after several weeks animal developed constipation, feces were hard and black in appearance; during June animal showed symptoms of paralysis; no edema could be noticed; no symptoms of scurvy; during the following weeks the animal alternately improved and got worse; died October 16.

AUTOPSY.

Heart in systole, right ventricle slightly edematous, no dilatation of right heart; right lung partly consolidated with tuberclelike masses; smears taken from lung by Dr. Stimson show no tubercle bacilli; liver dark red; spleen small and slightly dark; kidneys slightly congested; stomach hemorrhagic; mesenteric glands enlarged; ileum hemorrhagic; duodenum shows very thin walls; large intestine contains greenish-black feces, shows some injected areas; pancreas slightly hyperaemic; brain normal; spinal cord soft; skull and spine brittle; teeth are not loose; skeletal muscles normal; no hemorrhagic areas; no signs of scurvy.

MICROSCOPIC FINDINGS.

Heart.—Transverse striations still, visible but rather faint; blood vessels all congested; no pigmentation present.

Lungs.—This section presents a typical picture of pneumonia; all alveoli are filled with fibrin and polymorphonuclear leucocytes; the vessels are intensely congested; two small sharply defined necrotic areas are present surrounded by polymorphous cells.

Spleen.—This organ shows pronounced changes. The lymph cell areas, Malpighian, have almost completely disappeared; the capsule and trabeculae are especially prominent; the pulp is composed almost entirely of large endothelial cells which are filled with red blood cells and hemosiderin pigment. The walls of the central arteries are thickened. (See Figs. 19 and 20.)

Pancreas.—Congested; pigmented areas occur; some of this pigment reacts to potassium ferrocyanide and hydrochloric acid, hemosiderin.

Kidney.—Many of the glomeruli are vacuolated, much desquamation of epithelia of urinary and collecting tubules has occurred; the vessels are congested; no pigmentation is present.

Stomach.—Superficial epithelium is eroded; the submucosa is intensely congested.

Small intestine.—Mucosa, submucosa, and muscularis are intensely congested; muscular wall in certain areas is atrophic.

Skin.—Sections of this tissue appear normal; a small degree of congestion is present in the subcutaneous vessels.

Central nervous system.—Sections of the cord fixed in alcohol show dilatation of the central canal and chromatolysis of the anterior horn cells. In many instances the nuclei of these cells stain solidly throughout instead of being vesicular.

Sciatic nerve.—As far as could be determined by the fixation—alcohol—the nerve is normal.

SUMMARY.

Gross appearances.—Heart, right ventricle edematous; lungs consolidated; liver congested; spleen dark, atrophic; kidneys slightly congested; stomach hemorrhagic; mesenteric glands enlarged; ileum hemorrhagic; duodenum atrophic; pancreas slightly congested.

Microscopic findings.—Heart congested and slight degenerative change in muscle fibers; lungs congested, pneumonia; pancreas congested and traces of hemosiderin; spleen atrophy of Malpighian areas, pulp atrophic, congested and pigmented, hemosiderin; kidney shows degeneration, degenerative changes in epithelium of urinary and collecting tubules, also congestion; gastrointestinal tract shows desquamation of superficial epithelium, congestion, and atrophy of muscular walls; spinal cord shows chromatolysis of anterior horn cells and nuclear changes.

SUMMARY OF CHANGES IN PIGS.

The pathological changes in the pigs may be briefly summarized as follows:

Autopsy findings: Emaciation; conditions that resembled scurvy; skull brittle; brain soft; cord soft; lungs edematous and consolidated; heart edematous; liver congested, dark red; pancreas hyperemia; kidney congested, atrophic; retroperitoneal lymph glands

enlarged; gastrointestinal tract congested, hemorrhagic, atrophic; spleen atrophic, congested.

Microscopic changes: Heart loss of striations to pronounced albuminous degeneration, congestion; lungs extreme congestions with herzföhlerzellen and blood cells in the alveoli, consolidation and pneumonia with its characteristic pathological changes; thymus pigmented and congested; liver intense congestion, liver cell cords interrupted as a result of this congestion, albuminous degeneration and atrophy of liver cells; spleen capsule and trabeculae prominent as a result of atrophy of the pulp, Malpighian follicles greatly reduced both in area and numbers, pulp congested, hyperplasia of endothelial cells which are filled with red blood cells and pigment, abundant hemosiderin; pancreas pigmented and congested; kidneys intense congestion, albuminous degeneration, vacuolization of the glomeruli: gastrointestinal tract congested, hemorrhagic, ulcerated; bone marrow pronounced proliferating activity; central nervous system, cerebrum vacuolated due to edema, chromatolysis and vacuoles in the pyramidal cells; cerebellum Purkinje cells very faint in their staining reaction; cord evidences of a mild and diffuse degeneration in all tracts, chromatolysis and vacuolation of anterior horn cells; spinal and sympathetic ganglion cells stain very faintly.

5. RABBIT—TISSUE CHANGES DUE TO ALUMINUM LACTATE ADMINISTRATION.

The following record shows the effect of prolonged administration of aluminum lactate on body tissues. The cellular changes are not unlike those reported by Von Doelken.

RABBIT NO. IV.

Fed on cabbage and whole wheat; received daily, with the exception of Sundays, 80 milligrams of aluminum lactate per stomach tube, beginning August 3. Animal lost considerable weight and died October 2.

AUTOPSY.

Heart and lungs normal; peritoneal cavity contains some bloody fluid; liver dark brown; spleen congested; kidneys congested; large intestine shows intensely hemorrhagic areas with small ulcers; small intestine shows thin walls, otherwise normal; stomach filled with undigested cabbage and wheat; fundus shows injected area; brain appears normal; cord soft.

MICROSCOPIC APPEARANCES.

Heart.—Extremely congested, striations very indistinct, sarcoplasm granular.

Lungs.—Congestion throughout, alveolar walls bulge out with congested capillaries. In many areas the sacs are completely obliterated.

Liver.—Only slightly congested.

Spleen.—Typical congestion. The Malpighian areas are reduced; the pulp is filled with red blood cells and hemosiderin. Large endothelial cells are numerous and filled with pigment and red blood cells.

Pancreas.—Only slightly congested.

Kidney.—Glomeruli are intensely congested. Congestion of all interstitial capillaries is prominent. The cells of the urinary tubule are granular.

Stomach.—The mucosa is congested; the submucosa and muscularis are atrophic; the individual fibers of the muscular coat are widely separated.

Intestine.—Intense hemorrhage into the mucosa; only here and there remnants of the epithelium are seen. The muscular coat is vacuolated (hydropic) and atrophic, in some areas only a meshlike layer of connective tissue fibers containing congested blood vessels remain in its place. (See Fig. 21.)

Cerebrum.—The pia is congested, also areas of round cell infiltrations are seen in this structure; the pyramidal cells are swollen, stain faintly, many of the nuclei are eccentric in position; the vessels of the cerebrum are congested throughout.

Cord.—The anterior horn cells have been greatly disturbed as they are finely and diffusely granular; the nuclei in many of these cells have disappeared. Vacuoles also appear in many of these cells. Larger vacuoles are seen in both the gray and white matter. A diffuse degeneration of fibers in the tracts is observed.

SUMMARY.

Gross findings.—Peritoneum contains dark fluid; liver dark; spleen congested; kidneys congested; stomach injected; small intestine atrophic; large intestine hemorrhagic and ulcerated; cord soft.

Microscopic findings.—Extreme congestion throughout thoracic and abdominal viscera with nutritional disturbances in the parenchymatous cells; hemorrhage, congestion, atrophy of muscular walls, and disappearance of epithelium are characteristic of the gastrointestinal system; central nervous system chromatolysis and nutritional disturbances of motor cells, edema of gray and white matter, and diffuse degeneration of tracts.

CONCLUSION.

From this report one readily sees the close similarity of the cellular changes due to chronic aluminum lactate poisoning and those alterations already considered resulting from malnutrition—starvation by withholding food or from food deficient in some essential constituent. That no specific pathological alteration can be attached to aluminum poisoning seems very probable. On the other hand, that the cellular alterations are due to nutritional disturbances as a consequence of a circulating toxic principle appears to be the case because of the resemblance of cell changes.

Before discussing the various cellular alterations as observed in our series of experimental animals the tissue changes in pellagra will be considered. As already intimated the pathological changes in the former simulate the latter in practically every respect. After pellagra is considered both will be discussed together.

PART II.—CELLULAR CHANGES IN PELLAGRA.

I. LITERATURE.

In the following references I have included the principal contributions on the pathology of pellagra. For a more complete bibliography of the most important of the numerous contributions on all phases of pellagra the reader is referred to Babcock and Lavinder's translation of Marie's *La Pellagre*.

Spessa (1) describes opacities in the arachnoid and adhesions of the meninges.

Hanneau (2) states that inflammation, hemorrhages, and ulcers are usually found in the stomach—observed by Strambio also. He further states that Brierre, of Boismont, in 1829 did five autopsies, finding congestion, hemorrhage, and ulcers of the stomach, and injection of the meninges, brain, and cord, with softening of the cord. Similar observations on the whole were made by Landouzy in 1852, and by others.

M. Bouchard (3) describes changes in the liver, heart, and spinal cord of a pellagra case. Fatty degeneration of the liver was observed; the heart showed both fatty degeneration and infiltration with acetic acid resisting pigment in the sarcoplasm; the cord degeneration was not confined to any specific tract, both the internal and posterior portions of the posterior tract and the external portion of the lateral columns were the seats of pronounced alterations; congestion of the vessels of the cord and sclerosis of the cord were noted; numerous amyloid bodies were found throughout both the white and gray matter.

Verga (4) describes inflammation of meninges; congestion of meningeal vessels; osseous deposits in the meninges; constant alterations in the cord, softening or induration of both substances; and atrophy or degeneration—more especially in the dorsolumbar region.

Ch. Bouchard (5) summarizes the pathology of pellagra as found in Gintrac's *Traite de Pathologie* as follows: The skin is shiny, delicate, dense like parchment and a thickening at the borders of the erythema is seen; the latter has sometimes a brownish tint or is more often decolorized; the cranial bones are thickened; the dura is very adherent to the cranial bones and to the brain; the falx contains numerous ossifications, the vessels here are engorged; the arachnoid is thickened; the vessels of the pia are injected; hydrocephalus is present, as evidenced by dilated ventricles; the brain may be normal, firm, more often soft; the cerebellum is injected, indurated or soft; atrophy of the medulla has been found and softening of the cord more often in the lumbar region; various alterations have been described in the lungs, such as inflammations, tubercles, all of which

may be independent of pellagra; the heart is flaccid; congestion, hemorrhage, and inflammation of the gastrointestinal tract are present; in one case the pancreas was enlarged; the liver is usually large; the spleen may be large, small, soft, or indurated.

Billod's (6) conclusions are as follows: (a) That softening of the spinal cord is as frequently observed in the insane who have had pellagrous erythema as in the others. (b) That this same softening is not observed as frequently in the pellagrous insane as the casual result of his first observation led him to suppose. (c) That the pellagrous insane that do not show these softenings, are, in general, the patients in whom the disease had had a more rapid course and has early terminated in death. (d) That the nonpellagrous insane who have this softening in question are the patients who have been for a more or less considerable period in a state of cachexia more or less profound and who required only the erythema to be classified as pellagrous.

Bassi (7) describes alterations in various organs. According to him the heart shows brown atrophy and fatty degeneration of the muscular fibers; the ganglia of the cervical sympathetic system show pigmentation, fatty degeneration, and atrophy; the skin is sclerotic and thinned. He found upon consulting other records that more than one-half the cases of pellagra died from intercurrent diseases. But in the acute cases—typhoid pellagra—he was constrained to place the cause of death on the condition of the respiratory organs. According to him the lungs were always edematous and occasionally in the state of gray hepatization; the pneumonia, however, instead of being either distinctly lobar or bronchial, was more of the type of aspiration pneumonia or like that obtained by Friedlander after cutting the vagi nerves. The air sacs were filled with lymphoid cells, red blood cells, and fluid. Bassi found no appreciable lesions in the vagi nerves of pellagrins, but noted changes in the medulla which might be responsible through the vagi for pneumonia. These changes were gray degeneration of the nerve substance beneath the ependyma which covers the floor of the fourth ventricle in the region of the alae cinerae. The dura resembled pachymeningitis hemorrhagica interna acuta.

In transverse sections of the cervical spinal cord Bassi found a marked proliferation of the ependyma of the central canal and in the gray substance of one of the anterior horns he found three very large vessels with sclerosed walls such as are found in *tabes dorsalis*; scattered through the gray substance were numerous amyloid bodies.

Dejerne (8) described lesions observed in the cutaneous nerves. Pronounced degeneration of the myelin sheaths was present in two cases; the degenerations were at the site of the exanthema, and he

concludes that the skin lesions in pellagra are due to trophic disturbances of nerves.

Hirsch (9) summarizes the alterations in pellagra as follows: Hyperaemia and inflammation of meninges, liver, spleen, and lower intestinal tract; atrophy and marasmus, particularly of those organs innervated by the vagi and the sympathetics; fatty degeneration of different organs; pigment metamorphosis.

Tonnini (10) contributes an extensive paper to the pathology of pellagra. According to him, in the progressive orders of frequency the following lesions have been observed: Subarachnoid hemorrhage in 4 cases and anemia of the membranes, accompanied by severe anemia of the cord in 8 cases; hyperemia of the cord in 15 cases. Opacities, thickenings, and adherence of membranes and osteomata are present. The latter is more frequent in pellagrins than in non-pellagrins. To these osteomata Tonnini attaches considerable significance, for according to him they may be responsible for the spasticity and heightened reflexes observed in some pellagrins. Osteomata are found almost exclusively in the posterior and posterior lateral tracts and chiefly in the lumbar region. In the spinal cord the following alterations are described by Tonnini: (a) Asymetry of the two halves with granular pigmentary degeneration and cellular atrophy and degeneration of tracts. (b) Hyperemia, which is always associated with that of the membranes. Punctate hemorrhages were also seen. This hyperemia is found more frequently in the lumbar region and is responsible for the feeling of increased resistance to touch—hardness. (c) Diminution of weight. In male pellagrins the cord was slightly less, while in female pellagrins the cord averaged at least 3 grams less in weight. (d) Softening: In every case this is a simple nonphlogistic softening and not red softening. It can not always be differentiated from that due to post-mortem changes. In some of these the vessels were occluded. Many granule cells were observed in the nervous tissue, and the axis cylinders were in stages of dissolution. It was difficult to differentiate between the gray and white matter in fresh sections. Edema was always associated with softening. (e) Anemia was frequently present. Microscopic examination of the cord showed intense pigmentation of both the anterior and posterior horns, which obscured the nuclei of nerve cells and in some instances the entire cell. This pigmentation is the most frequent microscopic finding. Lombroso and Bareggi had described pigmentation of sympathetic and spinal ganglion cells, but none heretofore had noted it in the horn cells. Atrophy of nerve cells was also noted by Tonnini as well as degeneration of lateral columns and posterior columns. Hence the microscopic findings in the cord are numerous and varied. These changes are different from those produced in ergotism.

De Hieronimis (11) claims to have observed in cases of pellagra a very pronounced small-cellular (*parvicellulare*) infiltration of the gray substance and the white substance of the cord; he also found infiltration around the ependyma, enlargement of the perivascular and pericellular lymphatic spaces, together with increase of the cephalo-arachnoidian fluid. In the central canal he noted partial endothelial proliferations of the ependyma, and corresponding to these points, in the adjacent periependymal gray substance, he noted inflammatory foci. These lesions were not constant in the different contiguous sections, but disseminated.

Marchi (12) described, in two cases of typhoid pellagra, changes consisting of degeneration of many fibers in the anterior lateral tract, diminution of the interweaving fibers in the anterior cornua, and marked pigmentary degeneration of the spinal and sympathetic ganglia. Marchi does not place much importance on the pigmentary degeneration of nerve cells, as this has been found in conditions other than pellagra. Fatty degeneration of the renal epithelium is also referred to by him.

Belmondo (13) contributes a detailed record of changes observed in the spinal cord in 20 cases of pellagra. These alterations were leptomeningitis, ossific arachnitis, pachymeningitis. Degeneration and sclerosis of the crossed pyramidal tracts—a constant condition—and of the columns of Goll and Burdach were found. These lesions are found chiefly in the dorsal and lower cervical regions. Constant alterations are found in the gray matter as well, namely, atrophy of the motor horn cells with increase of pigment. Belmondo regards these pathological changes as primary degenerations due to intoxication, the toxin having a special affinity for the pyramidal tract. The infective agent is introduced into the gastrointestinal tract.

In connection with the pathological alterations Belmondo discusses the clinical symptoms, which are paraparesis (sometimes a true hemiplegia), exaggeration of the muscular tone and increase of the tendon reflexes, paralytico-spastic gait, tremor, and uncertainty of movements in the upper extremities. The sensory alterations are not uniform.

Tuczek (14) studied the spinal cord in eight cases of pellagra. There were changes in all. Only in two cases was the posterior tract alone involved, while in six cases both the posterior and posterior lateral tracts had degenerated. In the former the median fibers were chiefly involved, while those next to the gray matter were normal. Of the posterior lateral tract fibers, the cerebellar tracts were normal, while the pyramidal tract fibers were those involved. According to Tuczek the spinal cord changes in pellagra stand between posterior tract degeneration and lateral sclerosis. These changes simulate similar lesions due to ergotism, alcoholism,

and other intoxications. Belmondo, however, held that the spinal symptoms in pellagra have little in common with ergotism, and that the anatomical symptoms likewise would support this view.

Neusser (15) found in one case of pellagra atrophy of the heart and liver, chronic catarrh of the stomach and intestines, subacute nephritis, induration of the retroperitoneal lymph glands. Microscopically the brain, cord, and sympathetic system were normal. In the second case Neusser described fatty changes in the heart, kidney, and liver, chronic catarrh of the gastrointestinal tract, and in the dura of the cervical enlargement, a condition of pachymeningitis interna which caused disturbances of muscular nutrition and skin of the upper extremities.

Lombroso (16) gives the results of his observations on 113 autopsies conducted on pellagrins. In the meninges he found opacities, thickenings, hemorrhagic extravasations, and purulent exudates; in the cerebrum, softening, atrophy, sclerosis, hyperemia, anemia; in the cerebellum, sclerosis, softening, edema. According to him, these findings agree with those of Marchi, Fanzago, Strambio, Verga, Rizzi, and Morelli. In the spinal cord, Lombroso states that the posterior roots of the spinal cord are affected, and that the lesions in the spinal cord simulate incipient tabes, except that few changes are seen below the dorsal region. In Babcock and Lavinder's translation of Marie's *La Pellagra* are found in more or less detail the pathological changes in other organs as described by Lombroso. These changes are similar to those described by other observers and are in general the various types of cell degeneration and retrogressive changes. These cellular alterations are by no means constant, but vary in different individuals.

Schreiber (17) conducted autopsies on 14 individuals who had died of pellagra. According to him, the most constant findings were: (a) Erythema—observed on the skin in 3 cases; in all of the other cases it was present in other portions of the body. In only 1 of these cases was the skin of the hands affected with swellings and excoriations. (b) Intense anemia, general or partial dropsy. (c) Stomach and intestinal affections—in 8 cases, chronic catarrh; in 2, superficial ulceration; and in 1, dysentery. (d) Changes in the central nervous system—in all cases, intense anemia; in 7 cases, simple serous edema of the brain and spinal cord; in 5 cases, serous softening of the brain around the ventricles, containing much serum, and at the base. These were the cases in which during life mental disturbances were manifested. The spinal cord in 3 of these cases were serously softened; in 2 cases, only in the posterior columns; and 1 case, in its entire upper half. With regard to the other pathological findings—in 1 case peritonitis was present, which in this case was probably the cause of death as an intercurrent infection; in 7 cases

tuberculosis was present; in 8 cases the liver was enlarged (fatty degeneration); in 3 cases, atrophy of the liver (cirrhosis); in 6 cases, spleen enlargement; in 4 cases, spleen atrophy and fatty degeneration of the kidneys; and in 1 case, contracted kidney.

Babes and Sion (18) observations may be summed up as follows: Muscle tissues atrophic, pigmented; bone embryonic tissue persisting and Charcot Leydig crystals in the marrow; mouth gingivitis with ulcers, hemorrhagic infiltration of gums; tongue atrophic, round cell infiltration; intestines atrophic, hyperemic, desquamation of superficial epithelium; lymph glands swollen, degenerated; liver atrophic, pigmented, fatty degeneration, congested, occasionally enlarged; spleen atrophic, pigmented; kidneys atrophic, granular, fatty changes rarely; heart soft, atrophic, friable, brownish color; aorta atheromatous plaques; blood anemia, poikilocytosis, reduced erythrocytes; amyloidosis of finer vessels; skin trophoneurotic disturbances, thickening of corneal and Malpighian layers of skin, erythema, hyperemia, edema; dura chronic irritative changes; pia edema, injection, pigmentation; nervous system degeneration of posterior tract including the columns of Goll and Burdack, degeneration of posterior roots and Clark's column. According to Babes and Sion, Lissaur's zone as well as the most anterior fibers of the posterior tract are less often affected in pellagra than in tabes. A similar observation had previously been made by Marie (19). Of nerve cells, those in Clark's column are always affected; pyramidal cells of cortex show chromatolysis, pigmentation; similar changes were present in anterior horn cells. In typhoid pellagra, the greatest changes are found in the gastrointestinal tract, central nervous system, and the skin.

Tizzoni and Fasoli (20) report the cultivation of a strepto-bacillus pellagræ from pellagrin blood smears. See also Tizzoni (21). This was verified by Wood, but Lavender found no such organism in smears obtained from various tissues taken from pellagrins.

Regarding the blood picture in pellagrins, much has been written. Noteworthy among the contributions are Buhlig (22), Lavender (23), Siler and Nichols (24), and Bybee (25). Lavender's article contains a review of other work done on the blood in this disease. His conclusions are: (a) That there seems to be present in pellagrins a fairly constant secondary anemia, usually not a severe type in the red blood cells. (b) That leucocytosis is rarely seen and is probably not a phenomenon of uncomplicated pellagra. (c) That the results obtained by various workers on differential leucocyte counts are very discordant and that conclusions should be drawn therefrom with much hesitation, though a relatively large mononuclear increase seems probable. (d) That nothing resembling a protozoal parasite has been observed. (e) Blood of South Carolina pellagrins is uni-

formly sterile as shown both in culture media and laboratory animals. He has not been able to isolate Tizzoni microorganism.

Harris (26) calls attention to the difficulties encountered in the study of pellagra pathology because of extreme chronicity of disease—exacerbations of the disease being frequently mistaken for acute cases, patients rarely die in earlier stages of the disease, intercurrent maladies frequently take patients off and as a consequence the morbid anatomy of the two diseases confounded—no instance of pathology of single uncomplicated case of pellagra in the earlier stages, but on the other hand, all studies have been made on old complicated pallagrous tissue. He predicts the future will show that the initial changes are in the central nervous system.

In the report of the Pellagra Commission of the State of Illinois (27) nothing specific was found in the pathological studies of pellagrous tissue. Its findings may be summarized as follows:

Nervous system: Axonal chromatolysis of nerve cells in praecentral convolutions, cells of nuclei in pons, cerebellum, medulla and posterior roots of cord and sympathetic ganglia. Many of these cells showed pigmentary degeneration and fatty changes similar to that found in senile nervous systems; little evidence of connective tissue proliferation. The picture resembles central neuritis.

Liver, constant seat of low grade inflammation of portal connective tissue lying in the interlobular septa; the intralobular capillaries engorged and in most cases many small blood extravasations; peripheral fatty degeneration; intestines, ulcerations in 3 out of 7 cases, no amoebae, low grade infiltration of the mucosa and submucosa; kidney, degenerative changes in renal epithelium, more or less interstitial nephritis, some of these in young cases, enlargement of capillaries and small hemorrhages in some cases; spleen, fibrous overgrowths and some small hemorrhages; heart, pigmentary changes in heart muscles at an age below that usually found—in some cases hyalin changes in intima of blood vessels.

The report concludes that: Evidently some toxic substances originating from the gastrointestinal tract are in the blood; these pathological changes may be secondary to pellagra, that is, as a result of metabolic disturbance, invasion of other agencies from gastrointestinal tract; this is no evidence of parasitic causes, except in the liver and gastrointestinal tract; the nervous system does not present any features similar to trypanosomiasis and parasymphylis because of absence of focal changes and perivascular infiltrations; the skin lesions are not due to post root involvement as the distribution of the lesion does not correspond to post root distributions. "Pellagra is sometimes described as a disease especially involving the nervous system. From the findings here described the nervous system seems

to be involved only as a secondary process and at a late stage of the disease, in this respect confirming the opinion expressed above from clinical study."

An interesting suggestion is that made by Wilgus (28) that the neuritis of pellagrins is similar to the neuritis described by Meyer (29). The latter found in 8 patients dying from exhaustion changes in Betz cells—haziness of the protoplasm, displacement of Nissl's bodies and axonal degeneration. Regarding this similarity, Wilgus states: "After having seen the symptoms described under the heading Central Neuritis (by Adolph Meyer) and then witnessing the symptoms noted as occurring in the terminal stages of pellagra it was not difficult to conclude that these terminal symptoms in pellagra were identical with those of Meyer's Central Neuritis. In other words, pellagra has central neuritis as a terminal condition, as a rule. Of course I am speaking here of the clinical side alone. Meyer believed this condition to be based on some toxic state, and suggested that alcoholism was frequently the basis on which central neuritis developed. After seeing cases of pellagra one can readily agree with him in his general conclusion that central neuritis is due to toxemia."

Niles (30), in his book on pellagra, refers to Dr. Sandwith's report on the pathology found in pellagra. According to the latter there is general cachexia and anemia; the skin showed exfoliation, atrophy, diminution of subcutaneous fat; the heart, liver, and spleen were atrophic; the lungs contained tuberculous lesions; intestines, erosions of superficial epithelium, atrophy of the muscular coats; cord showed degeneration of posterior tract and roots; Goll's column was most affected. According to Niles, Thrash performed four autopsies on pellagrins. The findings were, in general: In acute cases—hyperemia and cloudy swelling of all organs. In chronic cases—atrophy, vacuolization, degeneration of nuclei, brown atrophy of visceral cells were the rule; the brains showed cell degeneration in the cortex, followed by sclerosis; spinal cord, degeneration and sclerosis of posterior and lateral tract.

Roberts (31) and Wood (32) summarize the pathological findings in pellagra.

Owing to the fact that so many contributions have appeared on this subject, I have been forced to omit many references which should perhaps be included. Mention is made of Strambio (33), Vassale (34), Liberali (35), Procupiu (36), Raubitschek (37), Valtorta (38), Guyot (39), Amabilino (40), Spiller and Anderson (41), and Brugia (42), who have contributed to our knowledge regarding cellular changes in pellagra.

Summary of literature.—From the extensive literature on this subject, the cellular alterations as observed by others may be summed up as follows:

Heart—softening, albuminous degeneration, fatty infiltration and degeneration, brown atrophy, congestion.

Lungs—edema, congestion, pneumonia, tuberculosis.

Aorta—atheromatous.

Liver—enlarged, atrophic, fatty degeneration, hyperemia, inflammatory.

Spleen—atrophy, enlarged, congestion.

Pancreas—generally normal, rarely enlarged.

Kidneys—atrophic, cloudy swelling, congestion, pigmentation.

Gastrointestinal tract—congestion, hemorrhagic, ulcerated.

Meninges—congestion, hemorrhagic, adhesions, opacities, osteomata.

Brain—injection, induration, softening, degeneration of pyramidal cells.

Cord—degeneration chiefly in crossed pyramidal tract and in columns of Goll and Burdach. These lesions are located most frequently in upper thoracic and lower cervical; however, they have been described at various levels. Pigmentary degeneration of spinal ganglion cells, anterior horn cells, sympathetic cells. Amyloid bodies in cord have been described.

Skin—atrophy, hypertrophy, erythema, exfoliation, etc.

Bones—fragility, embryonic marrow.

Pigmentary degeneration: in heart, liver cells, cerebral vessels, in addition to that described in the nervous system.

2. TISSUE CHANGES IN PELLAGRA AS OBSERVED IN THIS LABORATORY.

I have had the opportunity of studying the microscopic changes in a number of cases of pellagra. For the clinical histories and reports of gross morbid findings, I am indebted to various members of the United States Public Health Service who have within recent years confined their attention to the study of pellagra. The tissues were obtained from the hospitals at both Savannah and Spartanburg.

Only two complete clinical histories are included in this report, as these represent the typical cases.

The following records do not include all my observations respecting cellular changes in this disease, but include only representative cases. It was soon seen that the tissue alterations in all pellagrous cases observed were with slight variations very similar and that they resembled those described by other investigators. For this reason I have not included an extensive report of all tissues examined, nor have I included among the plates photographs of these alterations, as the numerous treatises and reports on pellagra are abundantly illustrated with them.

As previously intimated, my chief interest was to determine, if possible, whether there is a specific and distinct pathology to this disease and if a specific organism is present that might be related to the disease. The results of this phase of the work are included after the report on the general tissue changes. In submitting this brief report of the general tissue changes, no claim is made that this represents any additional contribution to our knowledge of the pathology of pellagra. My purpose is simply to make a comparison of these cell alterations with those already described in the experimental animal series.

CASE B. G. NOTES, CLINICAL AND AUPTOPSY, BY W. F.

HISTORY OF THE CASE.

Past history.—Admitted to the hospital March 21, 1914. Information obtained from husband. Born in Columbia, S. C., in 1872. Age 42. One child living, age 24. One child dead, cause unknown. Unable to read or write. Husband, special officer of the Central Railroad. Father, farmer, a periodical drinker. Patient's usual health was good until two years ago, since which time it has been declining, although patient did her housework until about a month ago, at which time she went to bed, remaining there a day or so, and then returning to work, which condition continued until two weeks ago. Then the patient developed an acute excitement and was placed in jail, since which time the acute excitement continued. In bed, apparently from exhaustion. Usual weight 145 pounds, present weight 90 pounds. Nothing known of either paternal or maternal grandparents, except they lived to be old. Father living, in good health; one maternal cousin said to have become insane; six brothers in good health; one sister killed accidentally; mother died at 40, probably insane for two or three years, said to have died from tuberculosis. Statement was made that the mother's condition was very much like patient's present condition. Birth of patient was difficult, instruments were used. General health in infancy good. As a child, was obedient and cheerful. Attended school but very short time. Husband does not know why patient did not learn at school. Six years ago had some vaginal operation performed at Savannah.

Present illness.—Just before the insanity began, it was noticed that patient would be blue and downhearted for a day or so and would be irritable and cross. No previous attack. Her memory before insanity very good; since it developed, memory has been poor. About a month ago, patient spoke of suicide, remarking that she had rather be dead than alive. Just before being placed in jail, she tried to hit her husband with her fist. At times she spoke of having considerable money—this was during the excitement. The month previous to insanity she at times said that her food did not smell nor taste right and complained of headache in frontal portions of head at irregular intervals during last six months. During last six weeks slept very poorly. Appetite very poor. Patient had two miscarriages, one several years ago, one about four years ago, cause of this unascertained.

Physical examination.—Many teeth missing; complexion sallow; panniculus scant; muscles flabby; mucous membrane very red and inflamed; on posterior surfaces of hands extending about 8 or 10 cm. up the wrist is the characteristic darkened, reddening of pellagrous eruption with scaling; this scaling is more marked on the dorsal surfaces of the fingers; over the second and third joints,

the skin is very much roughened and thickened; this condition is bilateral and symmetrical; the darkened discoloration is also over the posterior surfaces of elbows and along the course of the ulna nerve. Anterior surface of ankles show slight thickening and roughening; some roughening and scaling on toes. Eyes sunken; conjunctivæ anemic; pupils dilated, react to light, reaction rather sluggish; smell, sight, taste, and hearing could not be satisfactorily examined, neither could sensibility. Deep reflexes active. No clonus. Tremors not apparent. Speech showed no characteristic defect. Bowels constipated, according to history. Tongue appears red and deeply fissured. Abdomen rigid, boardlike.

Mental examination.—Patient brought to ward on stretcher, apparently very feeble. Lies in bed, inclined to follow in a vague way any movement that goes on about her. Talks to herself, and throws her hands, muttering at times in a very indistinct voice something about wanting water. Occasionally she will reiterate the same word in a monotonous tone until it becomes quite indistinct. She obeyed a few simple commands, such as opening her mouth, shutting her eyes for tremors, etc. Upon several occasions she referred to the physicians and nurses as "Pa." When asked where she was, she looked at the physician in a confused manner, opened her mouth and popped her teeth together several times. When asked what day it was, she said it was the 4th of July. "Where is your home?" "Pa." Many questions that were asked were not replied to. Patient continues to look about the room muttering some unintelligible words. It was evident that patient was in a delirious condition. Occasionally noticed to be very restless, drawing up her legs and arms. At such times tremors are noticed. She will move about in bed from side to side. Will permit flies to light on her face and make no effort to remove them.

March 24, 1914.—Within the last 24 hours the dorsal surfaces of hands and wrists became a pinkish color. This condition is bilateral and symmetrical.

Staff meeting.—Diagnosis: Pellagrous insanity, infective-exhaustive type.

March 30, 1914.—Patient confined in bed. Sleeps very irregularly. Rolls about from side to side picking at cover. Entirely oblivious to surroundings. Never speaks any intelligible words. Bowels very loose. Urine must be obtained by catheter. Face is frequently contorted. Lips are chapped. Tongue very much reddened. Saliva dribbles from corners of mouth on pillow. Patient pays no heed to questions nor does she assist in any way with her care.

April 17, 1914.—Patient has continued in delirious state formerly described. Picks at bedclothes. Coarse jerky tremors of the upper extremities are present. At no time has any intelligible reply been obtained to questions. She has developed a very marked odor; the red appearance of the skin has subsided, but left a scaly, darkened, roughened skin over the areas formerly involved. Bowel and urine discharges pass unheeded. Takes liquid nourishment when fed. Very evidently in a marked delirious state; that is, the appearance of a severe typhoidal state.

POST-MORTEM EXAMINATION.

Died at 6.10 a. m., April 24, 1914. Post-mortem at 7.45. White female. Extremely emaciated, showing slight bedsore formation over sacrum. Pupils equal 2.5 mm. diameter. Body still warm.

Roughened scaly skin over back of hands extending 6 cm. up the forearm and encircling the wrists. Small areas over both elbows posteriorly roughened and scaly, somewhat discolored. Small skeleton. On sections muscles very anemic. Abdominal and thoracic viscera normal with exception of liver, which extended about 6 cm. below the border of the ribs. Both lungs are

free of adhesions, normal in appearance. Right lung shows some edema and congestion in its lower lobe posteriorly.

Heart negative with exception of pale muscles and apparently slight increase of fibrous tissue in myocardium. Aorta shows small patches of atheroma.

Spleen considerably enlarged, slight increase of consistency. Both kidneys show nothing other than slight cloudy appearance on sections. Capsule stripped quite readily.

Liver appears enlarged and pale in color. Consistency about normal. Suprarenals normal in appearance. Stomach somewhat dilated, contains about 10 ounces of fluid. Mucosa hyperemic. Mucosa of duodenum appears hyperemic. Mucosa of ilium shows areas of very marked hyperemia. Mucosa of colon shows areas of petechial hemorrhages.

Uterus enlarged, due to several small fibroids. Tubes and ovaries normal in appearance, latter somewhat sclerosed. Pancreas normal in its appearance, somewhat enlarged.

Brain: Scalp negative. Dura negative. Vessels of pia are injected. No gross lesions of the brain discernible. Spinal cord appears rather small and fairly firm. Vessels of the pia are injected.

Sections taken from frontal, precentral, and calcarin areas of right cortex; from both lungs, both kidneys, spleen, liver, suprarenals, stomach, duodenum, ileum, colon, and pieces of both ulna nerves placed in 10 per cent formalin.

Weight of organs: Brain, 960 grams; cerebellum, 130; cord, 29.5; left lung, 170; right lung, 270; heart, 180; liver, 1,020; spleen, 180; pancreas, 170; left kidney, 120; right kidney, 120.

MICROSCOPIC FINDINGS.

Myocardium.—The muscle fibers are atrophic; the transverse striations are indistinct and in many cells can not be made out; there is a marked increase of brown pigment within the cells—in many instances extending the entire length of the cell—brown atrophy; many cells possess vacuoles—fat; the nuclei did not stain deeply.

Lungs.—Sections of this tissue show that a state of chronic passive congestion has existed for some time; all vessels are distended with red blood cells; a pronounced proliferation of connective tissue has occurred; as a result many of the alveoli have been completely replaced by this tissue. The connective tissue is very cellular, composed of both lymphoid and epithelioid cells—the former predominating; the walls of many alveoli are thickened; this thickness varies from a slight increase to complete occlusion of the alveoli; frequently the walls are seen to be ragged and broken; numerous “herzfehlerzellen” are seen both within the vascular lumina and in the connective tissue new growths. Much pigment (carbon) is seen in the lymph spaces.

Liver.—The section plainly shows that the liver has undergone atrophic changes; many lobules can be seen in the same field; the atrophic changes are most pronounced in those cells proximal to the central veins; here the cells are flattened—atrophic and wide intercellular spaces are seen; these cells possess much fine brown pigment—brown atrophy. As one approaches the periphery of the lobules the cells become more normal in structure; the pigment decreases and the intercellular spaces become narrower, gradually disappearing. Numerous large globules of fat are seen in the periphery of the lobules, especially around the portal veins.

Spleen.—The capsule appears thickened; the trabeculae are prominent; the walls of the blood vessels are thickened—especially is this true of the arteries. The Malpighian follicles are decreased in size, being limited as a rule to a

narrow zone around the arteries. There is relative increase of spleen pulp as compared with the follicles. The pulp is composed for the most part of large endothelial cells filled with red blood cells and pigment; numerous pigment granules are seen both intra and extra cellular. The section simulates that of beginning senile atrophy and passive congestion. Van Gieson's stain shows a more pronounced proliferation of connective tissue cells, especially from the capsule and trabeculæ. No hyalin changes, however, are seen. No amyloid substance is present.

Pancreas.—Cells are shrunk and broken; in all likelihood this is a post-mortem change.

Kidney.—This section of the kidney shows slight changes. The capsule is slightly thickened and congested; the stellate veins are congested, which is also true of the glomeruli and the interstitial vessels; the cells of the uriniferous tubules show a granular condition of the cytoplasm; the nuclei are normal in staining characteristics. No basal striations are seen in proximal convoluted tubules; the collecting tubules are normal in appearance; no increase of interstitial connective tissue was observed.

In another section the capsule is thickened and torn in many places from the cortex. In various areas extreme congestion of all the vessels is present. The glomeruli are filled with red blood cells, some are sclerotic, others hyalinized. Between the collecting tubules elongated areas of congestion and hemorrhage can be made out. A characteristic feature of this section is the pigmentation. This minute dark-brown pigment is present within the vessel lumina, the interstitial tissue around large blood vessels, and the epithelia of both the uriniferous and collecting tubules, and is especially abundant within the hemorrhagic areas. For the most part it is hemoglobin, as it does not react to Perls test.

Suprarenals.—No distinct pathological changes can be made out. The cells of the cortex, especially the zona fasciculata contain much lipoid substance; much pigment is also seen in the cells of the zona reticularis. These conditions, however, are not distinctly abnormal. The medulla appears normal; an accessory suprarenal is present. In Van Gieson's stain the capsule appears slightly thickened; a slight increase of the connective tissue framework appears to have taken place.

Stomach.—Pyloric end—all surface epithelium gone. Mucosa very cellular, containing numerous plasma cells; mucosa very congested, which is also true of the atrophic submucosa and muscularis. The muscular layers are very thin.

Jejunum.—Surface epithelium eroded; epithelium and goblet cells in bottom of crypts are normal; mucosa congested; submucosa and tunica muscularis atrophic.

Colon.—Superficial epithelium is eroded; these cells, as well as the goblet cells, are well preserved in the fundi of glands; the mucosa otherwise appears normal. There is a pronounced atrophy of both the submucosa and muscular layer. The blood vessels are congested. In many sections crystalloid substances can be made out in the epithelium. No pigmentation is observed.

Cerebral cortex.—A small piece of cerebral cortex, as well as a cross section of the sciatic nerve, was prepared. No degeneration tracts were observed in these after staining with Pal-Weigerts.

Dura.—In one particular area there is a focal chronic pachymeningitis consisting of new connective tissue and numerous blood vessels; the dura is not congested.

Pigment.—Heart, spleen, kidney, liver. Tests were made for hemosiderin in these tissues with the well-known Perl's test—potassium ferrocyanide and

hydrochloric acid. The pigment in these tissues did not react as a rule to this technique, consequently these granules for the most part are not hemosiderin. In the kidney, minute areas of iron-reacting pigment were found under the capsule and in the collecting tubules, both within the epithelial cells and blood vessels. In sections of these tissues, fixed in formalin and stained by Herxheimers, the pigment gave no reaction.

SUMMARY.

Gross findings.—Extreme emaciation; roughened, scaly skin on back of hands; anaemic muscles; right lung edematous and congested, especially lower lobe; heart pale, aorta atheromatous; spleen enlarged; kidney cloudy; liver large, pale; gastrointestinal tract hyperemic, colon contains petechial hemorrhages; pancreas somewhat enlarged; pia over brain is injected.

Microscopic appearance.—Heart brown atrophy, fatty degeneration; lungs passive congestion with herzfehlerzellen; liver atrophy, fatty degeneration; spleen sclerotic capsule and trabeculae, extreme passive congestion; kidney passive congestion, slight albuminous degeneration of the cells in the uriniferous tubules, hyaline changes are seen in many glomeruli; suprarenals normal; stomach congestion and atrophy of muscular walls; jejunum and colon superficial erosion of epithellum, congestion, atrophy; cerebrum and sciatic nerve show no degenerations of tract; dura congested, focal pachymeningitis.

CASE T. H.—CLINICAL AND POSTMORTEM NOTES BY W. F.—ADMITTED TO HOSPITAL MARCH 3, 1914.

HISTORY OF THE CASE.

Past history.—Information obtained from husband and patient. Family: Mother died at 40 following childbirth; father living, said to be insane; nothing known of grandparents; one paternal uncle said to be insane. Personal: Patient 43 years old; healthy as child; said to have been a normal child; attended school irregularly; menstruated at 15; married at 20; married life congenial; always healthy, with the exception of the history of pellagra; four children living; labor unaccompanied by any abnormalities.

Present illness.—Patient states that for about 15 years every spring or twice a year her hands would become red, as if sunburned; occasionally had an attack of diarrhea; condition would clear off, and patient would feel quite well between attacks; during last few years she lost weight progressively. She referred to the skin condition as "erysipelas." Denies ever having any mental trouble previous to the present, nor did her husband notice any. In September last year her hands again became red and scaly; at that time had sore mouth and diarrhea.

Physical summary.—Examination made March 6, 1914, three days after admission. Poorly nourished white female, showing considerable anemia; pallor of mucous membrane, thickened, discolored scaly skin over posterior surfaces of hands extending up the forearm about 8 cm. and encircling wrist; tongue presented a sleek appearance; deep reflexes all equally exaggerated; slight diarrhea present; subjective complaints of nervousness, burning of skin; pupils normal; no disturbance of cutaneous sensibility; muscular strength much reduced.

Mental summary.—Patient appeared depressed when interviewed, frequently wept, talking in an indistinct whining tone of voice, answers questions quite relevantly, seats herself in a rather dejected, uncomfortable manner, restlessly

picking at her dress or fingers. Frequently questions must be repeated. Cleanly in her habits; at times appears apprehensive, especially when alone in her room. Takes very sparingly of food; sleeps three or four hours of the night. Never associates with other patients. Remains in bed the greater part of the time; makes few requests. Has not learned the names of physician and nurses, and makes no inquiries. Begs to be allowed to go home. Expresses a few ideas of persecution, believing that poison had been placed in her food and milk. Claims that God has spoken to her at times, and that she has seen her children. Claims that she is very much frightened; says that she is afraid something is going to happen to her and her children. Admits she is down-hearted and blue. Is disoriented for place; does not recognize the character of the institution, other than it is some kind of hospital. Does not know the day of the week, but knows the month. Does not recognize the physician, but mistakes the examiner for another physician to whom she has spoken the day before. Her memory for recent events is very poor; believes that she has been at the hospital five days, when in fact she has been here but three. Knows she came on train, but has a very meager recollection of her trip to the hospital or what transpired soon after her reception. Her memory for remote events was much better. Patient was able to name her school-teachers and recalls events of her earlier life. Her grasp in general was in accord with her opportunities and station in life. Patient's mental calculation was performed slowly. She could not continue at a simple problem for any length of time, claiming that she became exhausted and could not think as she wanted to. Her retention of test words and numbers was defective. She had some insight into her condition; thought that there was something wrong with her mind; remarked that she could not collect her thoughts and keep them together, that her memory was poor at times, and that she frequently felt very confused.

Note, March 23, 1914.—The patient showed very little change in her mental and physical condition up until two days ago, when she became restless, very confused; at that time did not recognize the examiner or nurse, was entirely out of contact with her surroundings, muttered and mumbled to herself in an unintelligible manner. Coarse jactitory tremors of arms and legs were pronounced. Dorsal surfaces of hands and skin encircling wrists appeared very red and inflamed with scaly desquamation over reddened areas. Tongue very brightly red, gums and mucous membrane also showed reddishness. Bowels constipated. Patient did not understand questions that were asked her. At one time referred to the examiner by some name familiar to herself. Bowel and bladder control lost. Emaciation and anxious expression on the face quite apparent. Pulse, 110. Temperature, 97.8.

Note, March 26, 1914.—Patient continues in stuporous state, during which she could not be made to understand any questions and was entirely lost to her surroundings. She grew progressively weaker, muscular twitching and jerking became more pronounced. Died at 2 a. m., brought to post-mortem table at 9 a. m.

POST-MORTEM EXAMINATION.

Post-mortem examination made seven hours after death. Somewhat emaciated, scaly dermatitis over both hands posteriorly and encircling wrists; over both elbows, posteriorly darkened, roughened, scaly skin symmetrically situated; similar patches over sacrum. Pupils equal, 3 mm. Post-mortem discolorations over dependent portions of the body. Rigor mortis present in both extremities. On section, small amount of subcutaneous fat. Abdominal viscera in normal position. Thoracic viscera normal position. Both lungs negative, excepting slight edema and congestion at the bases. Heart, 275 gms., showed

nothing abnormal other than the muscle was pale and flabby and the valve flaps very slightly thickened. Aorta showed slight amount of atheromatous degeneration. Spleen somewhat congested, weight 120 gms., somewhat firmer than normal, slightly increased amount of connective tissue. Liver weighed 1200 grams, was pale and anemic, had cloudy appearance, central veins rather prominent, consistency about normal. Right kidney, 155 grams; nothing abnormal, capsule slightly adherent, entire organ rather pale. Left kidney, 200 grams, presented same appearance and condition; suprarenals negative. Uterus fibrous and slightly enlarged. Small intestines negative, with the exception of a few areas of congestion in the mucosa of the illum. Large intestine congested, patches 6 to 8 cm. in diameter in the mucosa, in some instances very marked. In areas of congestion a granular appearance was noted. These patches were irregularly distributed throughout the colon. The remaining viscera showed nothing abnormal to the eye. Skull of normal thickness, nothing abnormal noted in scalp; edematous pia mater; apparent increase of cerebrospinal fluid; adhesion between pia and dura in the neighborhood of longitudinal sinus slightly more marked than normal; pial vessels slightly congested and pia strips from brain very readily; no areas of softening or gross changes were observed; basal vessels normal in appearance. Cord: No gross abnormalities were observed; in region of the fourth lumbar interspace a perforation of the dura with a slight ecchymosis surrounding perforation was noted. (Patient was punctured at this site.) Piece of tissue taken from heart, liver, large intestine, kidney, brain cortex (paracentral lobe and frontal lobe), spinal dura, both ulnar nerves, and spleen.

MICROSCOPIC APPEARANCES.

Heart pericardium.—Five cm. thick; fatty infiltration with large congested blood vessels.

Myocardium.—Hypertrophied, considerable increase of interstitial connective tissue; myocardial muscular fibers in many instances segmented and fragmented; transverse striations for the most part distinct, slight amount of pigment at poles of nuclei—brown atrophy.

Tissues from the heart were fixed in formalin, sections were made by the frozen method and stained by Herxheimer's method. On examination of a section through the left ventricle the pericardium is found to be 0.5 cm. thick, due to the large amount of fat. This fat had infiltrated along the blood vessels and interstitial tissue into the myocardium. In the latter globules of fat are observed more or less irregularly distributed throughout the myocardium, especially in the connective tissue surrounding blood vessels. Fat globules are also present between the muscular fibers—these vary in size, but are usually larger than white blood cells. Within the sarcoplasm of many cells exceedingly fine fat granules are also seen. The endocardium is normal.

Liver.—Lobules indistinct but relatively large; the presence of congestion is evidenced by numerous erythrocytes seen between the liver cells; these cells, however, are not atrophic; the nuclei stain distinctly; considerable brown pigment is seen in the liver cells, especially those more centrally located; the portal veins are distended with blood.

Tissues fixed in formalin, sectioned by the frozen method and stained by Herxheimer's method. Practically all liver cells are filled with exceedingly fine fat globules, uniformly distributed throughout the entire gland. In many cells one large droplet of fat (undoubtedly the result of confluency of the smaller droplets) alone was seen occupying the entire capacity of the cell.

Stomach.—Epithelium is completely eroded; submucosa is very much congested; muscular layer is normal.

Kidney.—The capsule is slightly thickened; the glomeruli appear normal; the cells of the convoluted tubules are somewhat granular. The vessels throughout are congested. No abnormal pigmentation is observed.

Cerebrum.—The pia is thickened; its vessels are distended and congested; the cortex is congested.

SUMMARY.

Gross findings.—Case T. H. Somewhat emaciated; skin scaly, roughened dermatitis over exposed portions of hand and wrist; lungs slightly edematous and congested; heart pale and flabby; aorta atheromatous; spleen congested and firm; liver atrophic, pale, anemic, cells cloudy; kidneys congested, cloudy degeneration; suprarenals normal; small intestines contain few areas of congestion in ileum; large intestines, few areas of congestion; pia edematous and congested.

Microscopic appearances.—Heart, extreme fatty degeneration and infiltration; liver, congestion and pigmentation; stomach, erosion of epithelium and congestion; kidney, congested.

Nervous tissue from cases B. G. and T. H. was not available for microscopic examination. It was used for chemical analysis.

Tissues from the following cases were obtained at the United States Public Health Service Hospital at Savannah. The writer does not have in his possession notes regarding the clinical histories and post-mortem gross findings. However, these were much similar to the two cases just considered and represent the usual histories and post-mortem reports found in pellagrins, especially in the pellagrous insane.

CASE NO. 8.

MICROSCOPIC APPEARANCES.

Heart.—Endocardium is thickened; an increase of subpericardial fat is observed; the transverse striations are indistinct but still can be made out; characteristic brown atrophy is present; an increase of connective tissue is noted throughout the section.

Lungs.—The pleura is thickened; a typical picture of chronic passive congestion is noted; the alveolar walls bulge out and appear thickened as a consequence of distended tortuous capillaries. In many areas the alveoli are filled with "herzfehlerzellen" large endothelial cells filled with red blood cells; in addition to these, edematous substance fills the alveoli; much carbon pigment is present.

Liver.—The capsule is slightly increased in thickness; an increase of the connective tissue elements is noted throughout, which is plainly seen in Van Gieson's stain; congestion of all vessels is present; the intralobular capillaries are distended; the liver cells in closest proximity to the hepatic veins are atrophic and flattened as a consequence of the distended capillaries; these cells possess numerous fine amorphous brown granules which do not react to Perl's test—hence hemosiderin is not present.

Kidney.—The capsule is thickened; a general connective tissue increase is found throughout the section; the glomeruli are sclerotic and hyalin bodies are

found within them; the cytoplasm of the cells of the convoluted tubules are granular and a detritus fills the lumina; hyalin bodies are found within many of these cells.

Spleen.—The capsule is thickened, an increase of connective tissue is noted throughout the section; the trabeculae are very prominent; the pulp is congested, numerous red blood cells are seen; large endothelial cells, filled with red blood cells and a greenish brown pigment—hemosiderin—are especially prominent; the central arteries are in many instances sclerosed and hyalinized; hyalin bodies are seen in the reduced Malpighian areas.

Lymph gland.—Contains numerous hyalin bodies.

Spinal cord.—Cervical region an irregularly spherical new growth of glial cells immediately behind and bordering the commissure and between the posterior horns. The lesion does not reach the posterior surface and consequently does not supplant the entire posterior tract. Both columns (Goll and Burdach) are entirely destroyed immediately behind the commissure, but both are continuous at the posterior or superficial surface. The cells of this lesion are composed of more or less round or oval nuclei, which possess as a rule one nucleolus surrounded by deep staining chromatin granules. The nuclei average $5\ \mu$ in diameter. The cytoplasm is composed chiefly of a fine fibrillar net work. No cell boundaries are observed. At the periphery of the growth irregular radiating fibers from these cells extend into the white matter, between the neighboring medullated axones. The center of the lesion has undergone degeneration—liquefaction—only fibrin and a few nuclei remain. This new growth is undoubtedly glial in nature and apparently has had its origin from the ependymal cells lining the neural canal. The fibrils of these cells stain blue in Mallory stain.

In that portion of the posterior tract not directly affected by the lesion are seen, irregularly distributed, small round homogeneous bodies averaging $15\text{--}20\ \mu$ in diameter. These stain blue in Bensley's Neutral Gentian and were first observed by the application of this stain. They were also observed in other tracts. They are not numerous. These bodies are also stained blue in haematoxylin and eosin. Some show deeper stained substances within, but these substances are not present with any degree of regularity. I do not consider these bodies of any special significance. They are either amyloid, hyalin bodies, or droplets of myelin. No specific staining reaction of these bodies was obtained.

Unfortunately all tissues of this case had been fixed in Zenker's solution, and, as a consequence, it was impossible to determine accurately the degree of degeneration of the remaining portion of the posterior, lateral, and anterior tracts.

The nerve cells of the gray matter had undergone no pathological changes so far as it was possible to determine. The above lesion was limited to the cervical region. Its extent there, however, was not determined, although it appeared in two segments removed below this.

Dorsal region.—Tissues taken from two regions of the thoracic portion of the cord do not show this type of lesion. Here a few of the above described bodies are seen in the white matter. The cells of the anterior horn and gray matter in general appear normal.

SUMMARY.

Microscopic appearances.—Heart, fatty infiltration, fibrosis, brown atrophy; lungs, pleura thickened, extreme passive congestion; liver passive congestion, fibrosis, atrophy, and pigmentation of liver cells; kidney fibrosis, congestion, sclerosis, and hyalinization of glomeruli, albuminous degeneration of cytoplasm

of convoluted tubules; spleen, increase of connective tissue of capsule and trabeculae, extreme passive congestion; spinal cord, a gliosis as seen in the cervical region which has resulted in an almost complete degeneration of both the columns of Goll and Burdach, only the posterior peripheral fibers are intact. Hyalin or amyloidlike bodies are found in the posterior tract.

No specific significance is attached to either the glial proliferation or these bodies.

CASE P.

The tissues from this case were fixed in Zenker's solution and formalin and embedded in paraffin.

Heart.—Endocardium thickened; transverse striation indistinct; the nuclei, however, are normal in the staining characteristics.

Liver.—No distinct changes observed.

Spleen.—Extreme passive congestion, the lymph cell areas reduced in size; the pulp is relatively increased; numerous red blood cells are found in the pulp. A hyperplasia of the endothelial cells of the pulp has occurred—these are filled with red blood cells.

Kidney.—Capsule is thickened, the stellate veins are congested; this is true of the vessels throughout; no changes are observed in the epithelial cells of the tubules.

Spinal cord.—Thoracic region—pia appears normal; peripheral fibers of both the posterior and lateral tracts appear degenerated; the white matter is vacuolated throughout; the anterior horn cells are normal in appearance.

Sections from the cervical and lumbar regions show similar picture to that described for the thoracic region.

No changes are observed in the spinal ganglia cells.

CASE W.

Liver.—A general cirrhosis throughout the section is noted; the liver cells are atrophic and pigmented, this is especially evident of those cells closest to the central veins; those cells which occupy the periphery of the lobule are vacuolated, fatty degeneration or infiltration; the original liver cell cords are broken up into islets and separated from each other by connective tissue.

Spleen.—Capsule is thickened; extreme congestion is present throughout; the Malpighian bodies are reduced in area; the pulp is especially prominent and filled with red blood cells and endothelial cells.

Kidney.—Convoluted tubules are for the most part dilated; the cytoplasm of these cells are granular and a detrititis is seen in the lumina; an increase of connective tissue is noted, especially is this true in the glomeruli.

Spinal cord; cervical region.—Congestion is seen in the vessels of both the gray and white matter. The pyramidal tract has completely degenerated; a degeneration of the marginal fibers of the posterior tract is also present; the cells of the anterior horn appear normal.

CASE R. K.

The tissues from this case consisted entirely of spinal cord and were prepared according to Pal-Weigert's method.

Cervical region.—The pyramidal tract is slightly degenerated; degenerated fibers are diffusely distributed throughout this tract.

Thoracic region.—Here many diffuse degenerated fibers are seen in the posterior tract as well.

Lumbar region.—Fewer degenerated fibers are seen in the posterior tract than in the thoracic region.

CASE T. W.

Spinal cord prepared according to Pal-Weigert's method.

In the cervical and dorsal levels of the cord only a diffuse marginal degeneration was noted in the posterior and lateral tracts.

Tissues from other pellagrins were examined, but the histological findings were not dissimilar to those already described and consisted in general of passivé congestion of practically all the viscera with degeneration of the parenchymatous tissue of the various organs.

SUMMARY.

The tissue alterations in pellagra, as observed in this laboratory, may be summarized as follows:

Gross changes.—Extreme emaciation; exposed surface of skin scaly, roughened, dermatitis; muscles anemic; lungs congested and edematous; heart pale and flabby; aorta atheromatous; spleen enlarged, congested; kidney cloudy; liver large, pale, atrophic, anemic; gastrointestinal tract hyperemia, petechial hemorrhage; pancreas somewhat enlarged; pia injected.

Microscopic findings.—Heart—fatty degeneration, fatty infiltration, brown atrophy, fibrosis; lungs—passive congestion, fibrosis; liver—extreme passive congestion, fatty degeneration and infiltration, pigmentation, atrophic and broken liver cell cords, fibrosis; spleen—extreme congestion, atrophy, thickening of trabeculæ and capsule, reduction in areas and numbers of the Malpighian follicles, hyperplasia of endothelial pulp cells which contain ingested pigment and shadows of red blood cells; kidneys—passive congestion, albuminous degeneration, hyalin changes, sclerosis of glomeruli and interstitial tissue; gastrointestinal tract—congestion, superficial erosions of epithelium, atrophy of muscular coats; dura—congestion and pachymeningitis; cord—gliosis in posterior tract with degeneration of the columns of Goll and Burdach, degenerations of pyramidal tracts, diffuse degenerations in other tracts, numerous small amyloid or hyalin bodies, congestion of both white and gray matter.

Conclusions.—These findings are very similar to those observed by other investigators (see summary at end of literature on pellagra, p. 40). My findings differ only in the degree of pigmentation which is so emphasized by others. I failed to find the pronounced pigmentation of nerve cells reported by many observers.

In attempting to determine whether there were present any cell alterations that might be regarded as specific to pellagra, or any

organism that might be a specific etiological factor, the following technique was used:

1. Sera from pellagrins was examined by the—

- (a) Dark field illumination.
- (b) India ink method of Burri.

2. Tissues prepared by—

- (a) Levaditis method.
- (b) Giemsa's method.
- (c) Stimson's method for staining Negri bodies in section.

3. Numerous fixation solutions were used in addition to alcohol, formalin, and Zenker's solution. Among these were:

(a) Modified Kopsch formalin bichromate solution—

Formalin 40 per cent, 1 part; $K_2Cr_2O_7$ 3 per cent aq. sol., 3 parts;	
1 part.....	1 part
Sat. sol. of H_2Cl_2 in 95 per cent alcohol.....	1 part
Distilled water	2 parts

(b) Bensley's sublimate alcohol bichromate solution—equal parts of saturated solution H_2Cl_2 in 95 per cent alcohol and $2\frac{1}{2}$ per cent aqueous solution of $K_2Cr_2O_7$.

(c) Formalin bichromate solution, neutral formalin 10 c.c. and Zenker's solution without the acetic acid 90 c.c.

(d) Acetic osmic bichromate solution:

$K_2Cr_2O_7$, $2\frac{1}{2}$ per cent aqueous solution.....	8 c.c.
Osmic acid, 2 per cent.....	2 c.c.
Glacial acetic acid.....	1 drop

These various fixations are in special use among histologists for the purpose of preserving and demonstrating the finer structures of cells—structures that are not generally preserved in the standard fixation solutions such as alcohol, Zenker's, and formalin. Sections from these specially fixed tissues were stained in numerous dyes used for the demonstration of normal and abnormal cell structures. The stains utilized were: Geimsa's, Leishman's, Wright's, Herxheimer's, Van Gieson's, Weigert's elastic tissue stain, muchametein, mucicarmin, methyl-violet for amyloid, acid fuchsin methyl-green for metochondria, and various other stains used for the demonstration of protozoa and bacteria in tissues.

Tissues from all parts of the body of pellagrins were closely examined after being prepared according to these various special fixations and stains, but in no instance did I find any structure-organism or cell alteration that could be regarded as specific to pellagra.

PART III.—DISCUSSION.

When one compares the pathological alterations in pellagrous tissues with those changes seen in the various experimental animals, a striking similarity is observed (compare various summaries at the

ends of the descriptions of each series with that of pellagra). Practically the same cellular changes are observed in: (1) the monkeys, white rats, Series I, and pigs whose diets consisted of food deficient in certain essential constituents, or whose tissues were unable to utilize the food substances in the circulation; (2) white rats, Series II, suffering from starvation consequent upon the total withholding of food; (3) rabbits fed on aluminum lactate, the presence of circulating toxins in the blood which interferes with nutrition; and (4) pellagrins. Of course slight variations are seen in the various individuals, but this can be readily explained by the fact that much variation always exists in the resisting powers of the various organs of individuals. No specific disease or abnormal process will cause identically the same pathological alterations in two individuals.

The cellular changes which were present in the tissues of both the animal series and pellagrins are:

- (1) Passive congestion.
- (2) Cloudy swelling.
- (3) Hydropic degeneration.
- (4) Fatty infiltration and degeneration.
- (5) Hyalin degeneration.
- (6) Amyloid infiltration.
- (7) Pigmentation.
- (8) Degeneration of nerve cells and axones.

There follows a brief general consideration of these various retrogressive changes—their nature and the etiological factors concerned in their production—with a view of applying them to the work in hand.

1. PASSIVE CONGESTION.

General passive congestion was the most common and striking feature of both series of tissues studied. Its general prevalence and wide distribution in the tissues both of pellagrins and of the experimental animals obviously demonstrate that no local conditions, such as intravascular obstruction or extravascular pressure, can be in any way responsible for it.

The causes of passive congestion, as is well known, are: (a) Cardiac affections, either weakness or valvular disease; (b) hindrance to normal respiration, such as accumulation of fluid within the thoracic cavity, intrathoracic newgrowths, or affections of the muscles of respiration, weakness or paralysis; (c) lowered blood pressure and pulse, this may be due to cardiac changes or to general inanition; (d) lack of general muscular activity; (e) general weakness and inanition. That most of these factors may be associated with malnutrition is well known.

With passive congestion other changes occur in the organs affected. The organ may become enlarged as a result of an increase of the blood, together with the associated edema and transudate, and a deep blue color is assumed. Oxygen in this blood is decreased. An increase of carbon dioxid occurs. Retrogressive changes soon manifest themselves, which are in the main due to: (a) Mechanical effects, stretching, and pressure; (b) chemical effects, diminished oxygen and carbon dioxid intoxication; (c) diminished nutrition. Those organs drained by the portal circulation will show these retrogressive changes earlier and to a more pronounced degree, owing to an additional etiological factor—intestinal intoxication.

The effects of passive congestion upon an organ depend upon: (a) Its structure and function—whether highly specialized, whether the capillaries are well supported, the degree of vascularity; (b) its relation to the general venous system, such as the effects of gravity, hydrostatic pressure; (c) the degree, nature, and length of the stasis. If the capillaries are not well supported, hemorrhages may occur with pigmentation, as in the gastrointestinal tract. Concurrent with degeneration and atrophy of the parenchymatous tissue, fibrosis may occur. In extreme and prolonged passive congestion, necrosis and gangrene may be the final result.

Associated with this constant passive congestion in both the pellagrous and animal tissues, the heart in practically every instance showed retrogressive changes. One may ask whether these changes in this organ were primarily the cause of the congestion, or if the two conditions appeared concurrently as a result of inanition. The latter seems to be the case, as in no instance in the case of the animal series and only in exceptional cases in pellagrins were heart lesions present. Again no protophyte was found in any of the organs—pellagrins or animals—that could be responsible in any way for this extreme congestion.

Passive congestion as a consequence of inanition is the most plausible explanation of this phase of the pathological changes in both the pellagrin and animal series. Certainly this is true in the animal series, and as the pellagrous tissue simulated the former in practically every respect, one is justified in concluding that the passive congestion in pellagrins, together with the associated retrogressive changes, is due to nutritional disturbances.

Let us now consider some of the retrogressive changes that have been observed in connection with these tissues and see if they can be explained from the standpoint of malnutrition.

a. CLOUDY SWELLING.

Cloudy swelling is a term first applied by Virchow to the appearance of some organs—heart, liver, and kidney—after certain in-

fections. The cut surfaces of these organs appear cloudy as if dipped in boiling water. Increase in size of organs, due to an increase of water within the cells, is often associated with this cloudy condition. The cloudiness is due to an increase of albuminous granules within the cells. Whether this increase is due to an accelerated absorption of albumin into the cells, resulting from stimulation of the latter by toxins, etc. (in which instance the cells have not utilized all the albumin), or is due to dissociated albumin already within the cell which makes up the cytoplasm, or to both conditions, has been a much mooted question. In fact the two processes are now fairly well recognized and can be differentiated. In both instances the granules clear up when fresh sections are placed in diluted acetic acid. When this is done in case of the former, the original or normal structure of the cell reappears. For example, if heart muscle is the site of cloudy swelling due to increase of albuminous granules as a result of increased absorption, the striations are seen again.

On the other hand, where granules are the result of disintegration of cytoplasm, while these also disappear in acetic acid, the original structure of the cell does not reappear, as this has been destroyed in the cytoplasmic disintegration. Thus, cloudy swelling, due to a superabundance of absorbed albuminous substance resulting from over stimulation of the cell—hence not in itself a cause of the death of the cell—is differentiated from granular disintegration of cytoplasm—a liquifaction necrosis, which has been described by Verworn (43), Durante (44), and others. The nuclear changes in true cloudy swelling are, as a rule, an initial increase of chromatin, which later accumulates in clumps and is followed by chromatolysis so that the nucleus is seen with difficulty. Owing to the great part that the nucleus plays in cell metabolism, changes in it are to be expected when the cell is over stimulated as is the case in cloudy swelling.

Probably no other cellular changes are more frequently described and oftener misinterpreted than cloudy swelling or albuminous degeneration. Every beginner in the study of pathology sees this condition in practically every section placed before him for study. The action of fixation fluids, Zenker's in particular, renders the cytoplasm of most parenchymatous cells granular in nature. Again, many cells are normally granular, such as leucocytes, tubules of the kidney, secretory glands, etc., and these granules are brought out more prominently as a result of certain fixatives. Post-mortem granular changes in the cytoplasm occur soon after death. So with all these conditions that may be responsible for the granular appearance of cells one can not be too conservative in the diagnosis of cloudy swelling from fixed sections.

True cloudy swelling is found in acute infection after certain poisons, such as phosphorus, may follow burns, and is found after starvation. Reference is made elsewhere to the cloudy swelling following starvation. It has been produced by Stilling (45) in the renal cells within 48 hours after ligation of the renal veins.

3. HYDROPIC DEGENERATION.

A plausible explanation of hydropic degeneration is that normally the constitution of protoplasm is in the form of colloid. As a consequence of disassociation of this colloid resulting from various factors, through cleavage or ionization, it forms crystalloid bodies. As long as the latter are present in the cell bodies in greater concentration than in the surrounding medium, water, of course, as a result of osmosis will flow into the cell. Attention has been called to the fact that in cloudy swelling the swelling of the tissue is due to an increase of water within the cell. This is probably the first step in hydropic degeneration. If sufficient water is thus imbibed vacuoles may appear within the cell, as is the case with heart cells and nerve cells after certain acute infections.

4. FATTY DEGENERATION AND INFILTRATION.

The term fatty degeneration—based upon the idea that the fat found in certain cells undergoing morbid changes was derived from the proteid of the cell—is still used, although later investigations indicate that this fat has another origin. The expression used by Mallory (46) "Cell degeneration evidenced by the presence of fat" is a better term.

In the consideration of fatty changes in the cell, one must differentiate between fatty infiltration and fatty degeneration, although in some instances, as in the case of liver, this is impossible. The former, in all tissues except the liver, involves connective tissue cells; in the liver the parenchymatous cells are those affected. Fatty infiltration in certain connective tissues must be regarded as a normal process; for example, the accumulation of fat in subcutaneous tissues of some regions, in certain fascias—renal, omentum, and in the appendices epiploicae, etc. When it accumulates in other connective tissues which normally possess no fat, as in the heart, skeletal muscles, and connective tissue framework of the pancreas, the process may be regarded abnormal or pathological. Fatty infiltration of the liver may be both physiological, as in the later months of pregnancy or from overnutrition, or pathological as a result of disease. In fact it is impossible to state at all times whether demonstrable fat in the liver is physiological or pathological fatty infiltration or fatty degeneration.

Fatty infiltration is a storage of neutral fat within the cell. It results from an intake from the blood of more fat than the cell can utilize or from a reduction of the oxidation capacities of the cell so that it can not make use of that which normally should reach it. Of course, it is now generally accepted that neutral fats do not reach the cell from the blood as such, but that they enter in some altered form, perhaps in loose combination with globulin, and that later through the action of a cell ferment—lipase—neutral fats are formed. Some hold that the nucleus functions in this process, as demonstrable fat has been described in this structure during the process—Shattock (47).

Fatty degeneration, on the other hand, is primarily a cell degeneration. The nucleus undergoes chromotolysis and concurrently demonstrable globules of fat occur in the cytoplasm. That this fat has its origin from the degeneration proteid is a view that held favor for some time. This opinion was based upon a number of observations: (a) An actual increase of fat was observed in fatty degeneration of the liver even in starving animals. (b) F. Hoffmann (48) found more fat in the larvæ of flies grown from eggs nourished entirely on ox blood which contained a known amount of fat than the total fat contained in control eggs and the ox blood combined. (c) Again, there are the well-known experiments of Pettenkofer and Voigt (49) who found that upon feeding dogs a diet free from fat the carbon was retained in the form of fat. The explanation for the conversion of disintegrated proteid into fat is that the nitrogen-containing element is liberated while the carbon and its compounds are retained and converted into fat. Analysis of the urinary output seemed to confirm this view.

More recent work, however, goes to show that fat in fatty degeneration is not derived from proteid, but from preexisting fat. It has been shown in experimental phosphorus poisoning that while the fat in the liver increases there is diminution of fat elsewhere in the body. Taylor (50), Rosenfeld (51), and others have demonstrated this. Rosenfeld has shown that if a dog is poisoned with phosphorus or phloridizin and then fed with a foreign fat, such as mutton tallow, which differs in composition from dog fat, the fat in the degenerated liver approximates in composition that of the tallow.

According to this later view, then, fat in fatty degeneration has its origin from preexisting fat, which may be transposed from other cells or derived from masked fat already within the cell. That fatty degeneration may be preceded and accompanied by myelinic degeneration seems very probable—Kaiserling and Orgler (52), Lohlein (53), and others. Glycogen may contribute to the formation of this fat.

Fatty degeneration follows cloudy swelling of the cell; hence may be regarded as a second stage in cell degeneration. Those causations responsible for cloudy swelling, therefore, may be responsible for fatty degeneration. Other etiological factors are acute nonbacterial affections which include various poisons—arsenic, antimony, phloridzin, etc. It occurs in malnutrition, such as anemia, chlorosis, cachexia, starvation. It may be a physiological process as well, as in the normal secretion of the mammary and sebaceous glands.

5. HYALIN DEGENERATION.

Frequently in various cell degeneration materials accumulate either within the cell or in the intercellular spaces, which appear translucent or glossy. Various terms have been applied to this substance, depending upon its consistency, color, and chemical reaction.

Generally, if it is colorless, firm, and stains deeply with basic dyes, it is called hyalin. Substances that are colorless, firm, and react to iodine or stain metachromatically with methyl-violet are spoken of as amyloid. If instead of being firm, the substance is in the nature of a fluid and is colorless, the term mucin or mucoid is applied to it, while if the material is semisolid and yellowish or yellowish brown in color, it is referred to as colloid.

It is only with hyalin and amyloid changes that we are concerned, as these are the changes occasionally observed in the tissues of both the experimental animals and the pellagrins. Regarding the substance generally considered as hyalin, it may be stated that it occurs in various tissues and under different conditions. Sometimes it is found in thrombi and is known here as hematogenous hyalin, because it is derived from the blood elements—red blood cells as a result of agglutination or disintegration, or from the platelets. It may appear in the urine as clear translucent bodies, spheroids or cylinders—whether this is derived from the epithelial elements of the tubules or from blood structures is a mooted question. Hyalin is also formed in the connective tissues of the heart, lymph glands, and arteries; in the capillaries of the brain, liver, kidneys, spleen, thyroid, pancreas, and prostate; and in the connective tissue new growths of syphilis and tuberculosis. Occasionally it is found as an intracellular deposit in plasma cells, cancer cells, Russell's fuchsin bodies, smooth muscle fibers, and Zenker's degeneration of striated muscle.

The etiological factors in the production of hyalin are chronic inflammations such as tuberculosis, prolonged pyogenic infections, typhoid fever, smallpox, trichinosis, etc., and after nonbacterial toxins, alcohol. It also appears apparently without any decided causes.

6. AMYLOID INFILTRATION.

Amyloid infiltration, or a better term is chondroid infiltration, for amyloid is now regarded as a combination of a proteid, histon, and chondroitin sulphuric acid, thus similar to cartilage in composition, is found in the connective tissue framework of various organs. For example, in amyloidosis of the liver, the substance is first found in the capillaries just outside of the endothelial layer. Later it is seen to accumulate in the connective tissue of the arteries, and finally may be seen in the veins. Amyloidosis may be either general or local. In the former condition, amyloid usually makes its appearance in the spleen, liver, and kidneys. Occasionally it is seen in the skin, bones, lung, and nervous tissue. It is doubtful whether it ever appears as an intracellular deposit. Among the causes of amyloid infiltration may be named prolonged suppuration with breaking down of proteids; i. e., tuberculosis, syphilis, chronic suppurative osteomyelitis, actinomycosis, chronic dysentery, ulcerating new growths. It is also found in malaria cachexia, chronic anemia, and leukemia.

Thus it is seen that both hyalin and amyloid changes may result from many factors.

From this general consideration of retrogressive changes it is seen that cloudy swelling, hydropic degeneration, fatty infiltration and degeneration, hyalin degeneration, and amyloid infiltration may result from disturbances in nutrition. For example, cloudy swelling has been shown to develop after ligation—passive congestion—of the renal veins. It is also generally seen in tissues after prolonged starvation. Hydropic degeneration is a sequence of cloudy swelling. Fatty infiltration, whether due to defective oxidation, a condition which may be associated with passive congestion, or to the storage of neutral fats within the cells, is associated with malnutrition. Fatty degeneration which may be a sequence to cloudy swelling—a second stage in the retrogressive changes is frequently found in starvation. Its presence in anemia, chlorosis, and cachexia is further evidence of its association with nutritive disturbances. Our series of animals show that both hyalin and amyloid changes may be present in malnutrition. Also, these changes have been observed in post-mortem examinations where death has resulted from extreme inanition and where no evidences have been found that chronic suppurative processes have been present.

Thus from the observations of others as well as from our own we may conclude (1) that retrogressive changes do frequently occur as the result of extreme nutritional disturbances, (2) that the cellular changes are practically similar whether the malnutrition is due to withholding of food, inability of the tissues to utilize food that

is present in the circulation, absence of some essential constituent of the food, or toxins which may interfere with assimilation; (3) that the cellular alterations in pellagra are practically identical to those obtained in our experimental animal series as a result of induced nutritional disturbances and consequently all cellular changes in pellagra may be explained from the standpoint of malnutrition.

7. NUTRITIONAL DISTURBANCES.

Before considering these various pathological conditions, a brief discussion of nutritional disturbances will not be out of place.

Nutritional disturbances are due to the following factors: (1) Insufficient food, either by withholding it or due to gastrointestinal disturbances—starvation in varying degrees; (2) foods in sufficient quantities but in such condition that the assimilation organs can not use them as foods; (3) constitutional defects in the organism, so that foods, even in ideal combinations for normal metabolism, can not be utilized; (4) foods deficient in some essential constituents—vitamines.

With the symptoms and pathology of starvation we are familiar. Circulating proteins are first drawn upon. This is followed by a withdrawal of the glycogen from the liver and muscles in general. Then the fatty stores of the body follow. The next step is a shrinkage in the muscles—those least used are first to show this condition, while those most active undergo diminution last, as, for example, the heart. Excretions of all organs are diminished. The leucocytes are reduced. Death follows.

A number of disorders are due to foods taken into the body which, although sufficient in amount, are nonassimilable. Scurvy is a typical example of this and may be due to either a deficient amount of proteids, as in the case of those whose dietary consists chiefly of potatoes, or when proteids are present in superabundance. In the latter condition, it is generally canned or salted meats that produce scurvy. Barlow's disease in infants, much similar in symptoms to the scurvy of adults, is usually found in those whose food—milk—has been artificially prepared. Both diseases are rapidly ameliorable to correction of diet. In case of scurvy, fresh fruit or acid fruit juices, and in case of Barlow's disease, nontreated, natural milk, are sufficient to correct these disorders. In both diseases the food was altered in some way so that sufficient assimilation could not take place. Whether the alteration is due to some association or dissociation of the salts—calcium, phosphorous, sodium—so that they can not be utilized, or is due to some other change in the food devitalized, still remains a debatable problem.

That mineral matter is essential to metabolism has long since been known. Deficient iron causes disturbances in the hemopoietic organs. Insufficient calcium in foods results in inadequate growth of bones. While phosphorus incommensurate to the body's needs results in delayed growth.

On the other hand, that there is a destruction or alteration of some substance in the food—a devitalization—appears probable. The term “vitamine” has been applied to this substance. Regarding this term, Stewart (54) comments: “It might be better in the present state of our knowledge to avoid giving those bodies a name which may easily mislead. They might possibly be provisionally spoken of as vitines, a term involving no assumption as to their chemical nature, and implying only their importance in the nutritional processes associated with the life (and growth) of the tissues.” The chemical structure of vitamines (vitines) is problematical—probably a basic nitrogenous substance. That it can be extracted from foods rich in nucleo-proteids has been shown by Funk (55) and McKay, and its nature has been an important problem for study in the Hygienic Laboratory.

Many now hold that scurvy is due to deficiency of vitamine, and in this same category of diseases rickets, pellagra, and beriberi are included. That the last is sometimes due to a dietary of polished rice is no longer questioned. The vitamine of rice is contained within the outer coats and in the milling of rice these are removed. Peripheral neuritis, characteristic of beriberi, has been caused in pigeons by feeding them polished rice. The pathological changes in these pigeons include, in addition to those changes that accompany neuritis, complete atrophy of the thymus, disturbances of the pituitary, and atrophic changes in the sex glands.

Regarding the other pathological changes consequent upon the lack of nutrition, Adami (56) states: “Beyond simple shrinkage there are no marked changes until the animal has lost 10 per cent of its weight, then cloudy and granular alterations are to be seen in the cells of larger glands—liver and kidney—and in the muscle fibers. In the liver cells, according to Statkewitsch, the glycogen disappears at a comparatively early stage, and there is cloudy swelling; later, again, in the outer cells of the lobules, there is extensive fatty infiltration; large fat globules distending the cells. In the mucous cells of the salivary glands there are the appearances of fatty degeneration.”

Thus it is seen that according to the observations of others, nutritional disturbances are associated with cellular disturbances similar to those observed by us. Space will not permit a general comparison of tissue changes in pellagra with those of beriberi, rickets, and scurvy—but there is much in common. In fact from the pathological

standpoint, I can see no reason why pellagra can not be included in this category. Likewise there can be no objection to including within this class the monkeys, white rats, Series I, and pigs whose diets while quantitatively sufficient certainly consisted of foods deficient in some essential constituent. The cellular alterations in all are very similar.

8. PATHOLOGICAL ALTERATIONS IN THE NERVOUS SYSTEM.

The pathologic retrogressive changes in the cells of the nervous system are demonstrated in the following: (1) Swollen cell body; (2) chromatolysis; (3) peripherally located nucleus; (4) vacuoles, fat, and pigment in the cytoplasm; (5) disappearance of axonal medullary sheaths; (6) complete necrosis and disappearance of cells. These retrogressive changes have many etiological factors which may be classified as follows: (*a*) Constitutional—*anemia, cachexia, chlorosis*; (*b*) mechanical trauma; (*c*) circulatory disturbances—*thrombi, emboli, endarteritis, hemorrhage*; (*d*) toxins—*bacterial, mineral chemical, and vegetable*; (*e*) heredity—*transmissible defects*.

Just how the nervous system is affected is by no means a settled question. For example, many hold that there is a certain specificity between circulating toxins and nerve cells. Thus Oppenheim attributes *tabes* to this selection. Marie, on the other hand, held the opinion that this disease was due to syphilitic lesions involving the pericellular lymphatics of the nervous system.

A very feasible explanation of nerve cell degeneration is the so-called exhaustion theory of Edinger's based upon Weigert and Rous's theory of cell equilibrium. The theory is, in substance, this: All cells making up an organism are normally in a stage of equilibrium. Cells normally restrain other cells from excessive growth. However, if one cell or group of cells is destroyed, neighboring cells by hyperplasia fill the space originally occupied by the destroyed cells. Again, if a group of cells become weak and lose their resistance power, other surrounding cells may proliferate even to the complete destruction of the weak cells. Thus cirrhosis of the liver is simply a primary weakening, a loss of resistance, a degeneration of the parenchymatous tissue, accompanied by an overgrowth of more resistant cells—*interstitial connective tissue cells*.

Applied to the nervous system, the process is as follows: The nerve cell loses its resistance as a result of various factors. This may be due to insufficient nutrition; it may be due to the fact that the nerve cells are congenitally impaired; or it may be due to excessive function demanded of the nerve cell combined with nutritional disturbances. At any rate, when the cell is so impaired that it loses its normal resistance, proliferation of the glial cells occurs. The energy

of growth of the latter cells may be sufficient to cause the other functioning cells to degenerate. In fact, in many lesions of the nervous system it is difficult to state whether the lesion is due primarily to a degeneration of nerve fibers followed by gliosis or that the latter was responsible for the degeneration of the nerve fibers.

It seems that this exhaustion theory is the most logical one in interpreting the factors concerned with many nerve degenerations. Based on the general functioning demands made upon the nerve cells, those groups likely to suffer most from exhaustion are: The reflex arch fibers, sensory more so than the motor, and the pyramidal tract. The peripheral neurones would suffer before the central and perhaps the projection tracts before the association tracts. The arch reflexes and pyramidal tracts, of all others, function most in the normal activities of life. Hence, it would be these tracts that would first show the results of exhaustion, especially where malnutrition is concerned, such as seen in anemia, cachexia, and intoxication.

One of the most frequent sites of degeneration is seen in the posterior tract—columns of Goll and Burdach. It is seen in locomotor ataxia, chronic ergotism, pellagra, and many intoxications. The motor neurone of the arch is involved in many disorders, such as anterior poliomyelitis, both acute and chronic, progressive spinal muscular atrophy, progressive bulbar atrophy, etc. The pyramidal tract, together with the anterior horn cells, are destroyed in amyotrophic lateral sclerosis. Very frequently, however, both the reflex arch fibers and the pyramidal tract are simultaneously involved as in posterior lateral sclerosis; Friedreich's ataxia; constitutional disturbances, such as anemia and pellagra; and in chronic poisoning due to certain metals, such as aluminum—Siem (57), Von Doelken (58); lead—Stieglitz (59); mercury—Tirelli (60); and other substances—Tschisch (61).

It may be that the reflex arch as manifested in the degeneration of the posterior tract is first involved because of its greater functioning activity in many of these combined degenerations and sclerosis, and that the pyramidal tract is later implicated. That this may be true in pellagra is very likely, which would account for the fact that many have described degeneration in the posterior tract, others in the pyramidal tract, and still others have noted both tracts involved. I have observed sections from pellagrous cords in which the posterior tract alone was involved and others in which both the lateral and posterior tracts were degenerated. In general we may assume, then, that under average conditions the posterior tracts first show retrogressive changes in pellagra and malnutritions in general and that the pyramidal tract may follow in this course. If the retrogressive changes are prolonged, other groups of cells may be included, such as Clark's column—Babes (62). Exceptions

to this rule will be found, of course, in the numerous examples of inherited deficiencies of certain cells and tracts, in which case these will be the first to be involved.

It appears, then, that degeneration of certain tracts in the spinal cord in pellagra is not necessarily due to any affinity between a specific toxin of pellagra and certain nerve cell groups, but, on the other hand, the retrogressive changes may be due to disturbed nutrition as a consequence of this disease. Similar nutritional disturbances may be seen in certain constitutional disorders, as in anemia, cachexia, and chlorosis. They may result from numerous toxins, bacterial, vegetable, chemical, and mineral. All of which may produce similar pathological alterations in the nervous system.

Further, Prof. Voegtlin's feeding experiments demonstrate that similar alterations may occur in the absence of certain essential elements in the food. It will be recalled that in spinal cords of Monkey II and VIII, Burdach's columns in both were degenerated, while a more or less diffuse degeneration was present in the dorsal region. In other animals the spinal cord contained many alterations that could not be differentiated from those seen in pellagrins, with the exception of excessive pigmentation described in the latter by numerous observers. I did not note any marked pigmentation in the nerve cells of these animals, nor did I observe unusual pigmentation in pellagrous nerve tissue.

From a pathological standpoint, then, cellular alterations in the spinal cord as seen in pellagra are not specific to this disease but are seen in many types of malnutrition and may be produced experimentally by altered and insufficient feeding.

In the brain it is the pyramidal motor cells that are most frequently involved in pellagra, and the exhaustion theory is equally applicable to the explanation of the morbid changes found here. Next to the reflex arch, as has already been indicated, the pyramidal tract exercises the greatest function in the normal activities of life, and, according to the exhaustion theory, retrogressive changes in the central motor neurones would early present themselves when the nervous system is involved. Reference has already been made to Meyer's "central neuritis," found in patients dying from exhaustion, in which typical retrogressive changes were found in the perikaryons of the pyramidal nerve tracts. Meyer held that the etiological factors concerned in the production of this condition were of a toxic nature—alcohol. Wilgus concludes that the changes found in the cells of the pyramidal tracts in pellagra are similar to those described by Meyer, hence a central neuritis.

While my observations on central motor cell alterations in pellagra are limited, they have been sufficient, I feel, to warrant me in con-

firming Wilgus's conclusions. Involvement of the central motor neurone in pellagra, then, is no manifestation of a specificity of this disease for these nerve cells, but, on the other hand, it shows that these cells have lost their resistance—exhaustion—in the process of the disease.

Our series of experimental animals show identically the same changes described by Meyer in Betz's cells. It will be recalled that these changes were produced by malnutrition, either to the absence of some essential constituent in the food or to total absence of food, or to intoxication (aluminum lactate) which may be a nutritional disturbance.

Pathological alterations in pellagra in the central nervous system, then, can be explained from the standpoint of nutritional disturbances.

At this point it will be well to state that one can not emphasize too much the error that many have fallen into regarding the presumed determination of the etiological factors of pellagra as a result of certain pathological changes obtained from the administration of certain substances, such as aluminates, silicates, etc. Cell alterations in the nervous system of pellagrins, as well as in the other organs of the body, are not specific to this disease. As has already been pointed out, they may result from other factors, most notably malnutrition, which perhaps in the final analysis alone may be responsible.

9. PIGMENTATION.

One other subject, pigmentation, demands a brief general consideration before our final conclusions are submitted. Its presence, especially in the nerve cells of pellagrins, has been described by many observers. Some hold that its presence in nerve cells is characteristic of pellagra, although the nature of the pigment is not stated.

The endogenous pigments derived from the blood—hemoglobin—and certain autogenous pigments which accumulate in some cells—heart and nerve cells—in later life, chief of which is lipochrome, are the ones with which we have to deal.

Hemosiderin is a collective term for an amorphous yellow or brown pigment derived from hemoglobin. It differs from the other derivative of the latter, which is known as hematoidin, in that it contains iron in loose combination—thus differing in this respect also from hemoglobin, its antecedent—which contains iron in close or masked combination with proteid. It is this iron, which can be readily detected microchemically, that characterizes hemosiderin. With ammonium sulphide it forms a black precipitate—iron sulphide, Quincke's test. The ordinary test used, however, is that known as Perl's test; with potassium ferrocyanide and dilute hydrochloric acid an insoluble Prussian blue is formed. Hemoglobin, on the

other hand, while it contains iron, does not react with these tests, owing to the fact that the iron is masked or closely bound with the albumin.

Hemosiderin is a product of the vital activity of cells and consequently is an ante mortem product, while precipitates of hemoglobin are usually due to post-mortem changes or to the action of certain fixation fluids—formalin. Hemosiderin is found in the outer zones of hemorrhagic areas, either free or within certain cells, such as leucocytes and endothelial cells. It is found in organs as a result of hemorrhages into them, or after extensive degeneration of red blood cells. The spleen, liver, pancreas, lymph glands, and walls of intestines are frequently sites of hemosiderin. The liver cells contain this pigment in cases of pernicious anemia and hemochromatosis.

Von Recklinghausen first called attention to the latter. Deposits of this pigment, according to him, are found in the intestinal wall which assume a yellow or yellowish brown color. When disease is more advanced, cirrhosis of the liver and pancreas occurs with depositon of hemosiderin within these organs. Diabetes may be present—diabetes bronze of the French. According to Dr. Maude Abbott, hemosiderin is found in the majority of cirrhotic livers. Hence the presence of this pigment is not specific to any particular disease, as is believed by some. Some hold that hemochromatosis is due to a mild infection, as an acute type of hemochromatosis has been described; i. e., a bacterial cyanosis due to *B. coli* bacteriemia.

In tissues described from the experimental series, it will be recalled that much hemosiderin was frequently found in the spleen and occasionally in other organs, liver and kidneys, thus indicating that an excessive destruction of red blood cells was taking place during life. Hemoglobin and hemosiderin were the only endogenous pigments of any degree that could be identified. In some animals, only traces of pigment were found in and surrounding nerve cells of both the anterior horn cells and pyramidal cells of the cortex. The nature of this was not determined, although it simulated lipochrome.

From references given it will be seen that pigmentation of anterior horn cells and spinal and sympathetic ganglia cells was almost a constant finding with many observers. While the nature of this pigment is not discussed, it is in all likelihood lipochrome. I did not find this to be the case in my examinations of nerve tissues taken from pellagrins. No extreme pigmentation of nerve cells was seen. Lipochrome was present, however, in various amounts. This pigment is not by any means specific to pellagra, but collects with advancing years, in addition to nerve cells, in various organs such as the heart, liver, adrenal, smooth muscle of intestine, and seminal

vesicle. Marchi also held that nerve cell pigmentation is not specific to pellagra.

In all likelihood this pigmentation of nerve cells as found in pellagrins is accelerated as a consequence of the degeneration process going on in the nervous system, but the pigmentation must not be regarded as a condition specific to pellagra.

CONCLUSIONS.

1. The morbid tissue changes resulting from malnutrition, as shown in our animal series, are (a) passive congestion in practically all tissues; (b) various degrees of retrogressive changes in many of the thoracic and abdominal viscera such as cloudy swelling, hydropic degeneration, fatty infiltration and degeneration, hyalin degeneration, amyloid degeneration; congestion, hemorrhage and ulceration of gastrointestinal tract; (c) pigmentation chief of which is hemosiderin; (d) degeneration in the central nervous system consisting chiefly of the reflex arches and the pyramidal nerve tracts.

2. The tissue alterations, including the degenerative changes in the nervous system, occurring in our series of animals as a result of malnutrition are strikingly similar to those observed in pellagrous tissue.

3. From a pathological standpoint there can be no objection to the classification of pellagra along with rickets, scurvy, and beriberi as dietary diseases.

4. A most rigid examination of numerous tissues obtained from pellagrins revealed no microorganism that can be regarded as a specific etiological factor, nor were any cell alterations present that can be considered as specific to the disease.

5. Pellagra, then, possesses no characteristic cell alterations, but the pathological changes are those resulting from malnutrition. Consequently it is erroneous to assume that certain substances such as silicates, aluminates, etc., are the etiological factors of pellagra, as some have done, because of the pathological changes that have been induced as a result of the administration of these substances.

6. The degenerations that occurred in the nervous system both of our series of animals and in pellagrins are readily explained by the exhaustion theory of Edinger, Meyers, and others.

7. The pathological changes in tissues in malnutrition are very similar, whether resulting from (a) no food; (b) unbalanced diets; (c) mild circulating toxins which interfere with nutrition of cells. In (a) congestion and fatty degeneration were more pronounced, while in (b) more pigment—hemosiderin—was present.

To Dr. John F. Anderson, formerly Director of the Hygienic Laboratory, and Prof. Carl Voegtlin, the writer is especially indebted for many suggestions. Appreciation is also due to Technical Assistant Walker D. Cannon, for valuable assistance rendered in the translation of that literature relative to pellagra.

BIBLIOGRAPHY.

1. Spessa, A. A.—Sulla Pellagra, *Omodie Annal di Med.*, Vol. 64, 1832, p. 207.
2. Hanneau, J. M. G.—Thèses, De La Pellagre, Paris, 1853.
3. Bouchard, M.—Etude D'Anatomie Pathologique sur un cas de Pellagre, *Comp. Rend. Des Seances d. La Soc. de Biol.*, Tome I, 48, 1864, p. 50-58.
4. Verga.—Ricerche necroscopiche sulla pellagre, *Gazzetta Medica italiana, Lombardia*, 1862, Nr. 22, p. 203.
5. Bouchard, Ch.—Recherches Nouvelles sur La Pellagre, *Anatomie pathologique*, Paris 1862, C. VIII, p. 145.
6. Billod, E.—Tracte de la Pellagre, Paris, 1870, Chapitre VI, *Anatomie Pathologique*, p. 186.
7. Bassi, G.—Cenni Interno Ad Alcune Particolari Lesioni Anatomiche Ricontrate In Soggetti Pellagrosi, Ed Intorno Ad Un Caso Di Micosi Cerebrale, *Bulletino d. Scienze Mediche*, 1880, Series 6, p. 160.
8. Dejerne, J.—Sur les altérations des nerfs cutanés dans la pellagre, *Compt. Rend. d. Seances, De L'Acad. d. Sciences*, Vol. XCIII, 1881, pp. 91-112.
9. Hirsch-Handbuch der historisch-geographischen Pathologie II, Stuttgart, 1883, quoted from Neusser.
10. Tonnini, S.—I Disturbi Spinali Nel Pazzi Pellagrosi, *Anatomia pathologica, Riv. Sper. di Fren. e di Med. Leg.* IX, 1883, p. 208, *Ibid.* X, 1884, pp. 63-72.
11. De Hieronimis—Breve Studio con una nuova contribuzioni sulla anatomia pathologica e sull etiologia della Pellagra (Dal laboratorio di Anat. patol. del Prof. Schrön), Napoli, 1885, quoted from Belmondo.
12. Marchi, V.—Anatomio-Pathologiche e Bacteriologiche sul Tifo Pellagroso, *Riv. Sper. di Fren. e di Med. Leg.*, 1888, XIV, p. 341.
13. Belmondo, E.—Le Alterazioni Anatomiche del Midollo Spinale, nella pellagra, *Riv. Sper. di Fren. e Med. Leg.*, 1889, XV, p. 266, *Ibid* XVI, 1890, p. 107.
14. Tuczek, F.—II. Ueber die nervösen Störungen bei der Pellagra, *Deutsch. med. Woch.*, Leipzig. 1888, XIV, pp. 222-225.
15. Neusser, E.—Untersuchungen über die Pellagra, *Wien. med. Woch.*, 1887, No. 5, p. 132, *Die Pellagra in Oesterreich und Rumänien*, Wien, 1887.
16. Lombroso, C.—Trattato Proflattico e Clinico Della Pellagra, 1892.
17. Schreiber, S. H.—Ueber Pellagra, *Wiener Med. Woch.* 1899, XLIX, nr. 10, p. 454.
18. Babes and Sion—Die Pellagra, Wien, 1901.
19. Marie, P.—De l'origine des lésions exog. du cordon postérieur étudiées comparativement dans les tubes et dans la pellagre, *Semaine méd.*, Paris, 1894, XIV, 17. *Atti del Congresso Pellagrologico I-IV, 1901-1910.*
20. Tizzoni, G., and Fasoli, G.—Saggio di ricerche batteriologiche sulla pellagra, memoria dell 'Accademia dei Lincei, Ser. 5, Vol. 6, Rome, 1906.
21. Tizzoni, G.—Interno alla patogenesi et etiologia della pellagra, Estratto del Bolletino del Ministero di Agricoltura, Industria e Commercio, Rome, 1909.
22. Buhlig, W. H.—Reporting Dr. Egan's work, *Trans. of Nat. Conf. on Pellagra*, 1909, p. 41.

23. Lavinder, C. H.—Notes on the Hematology of Pellagra, *Trans. of Nat. Conf. on Pellagra*, 1909, p. 33.
24. Siler, J. F., and Nichols, H. J.—Aspects of Pellagra Problem in Illinois, Part I, A statistical study of 100 cases at the Peoria State Hospital, p. 53.
25. Bybee—Report of the Pellagra Commission of the State of Illinois, 1911.
26. Harris, H. F.—*Trans. of Nat. Conf. on Pellagra*, 1909, p. 86.
27. Clinical and Pathological Studies, Report of the Pellagra Commission of the State of Illinois, 1911, p. 16.
28. Wilgus, S. D.—Central Neuritis and Pellagra, Report of the Pellagra Commission of the State of Illinois, 1911, p. 53.
29. Meyer, Adolph—Central Neuritis, Brain, 1901.
30. Niles, G. M.—Pellagra, 1912.
31. Roberts, S. R.—Pellagra, 1912.
32. Wood, E. J.—A Treatise on Pellagra, 1912.
33. Strambio, G.—An account of the Appearances on Dissection in Ten Cases of Pellagra. Abstract, *London Med. Rev. and Mag.*, 1799, I, pp. 488–494.
34. Vassale, G.—Ricerche microscopiche e sperimentali ecc., *pel.*, *Riv. Sper. di Fren. e di Med.*, Reggio, 1891.
35. Liberali, S.—Sulla condizione etc. Sur la nature inflammatoire de la pellagre et son extension à l'axe cérébrospinal, prouvés par les autopsies cadavériques et les observations cliniques, Venice, 1839.
36. Procupiu—La pellagre, vol. 8, Paris, 1903, p. 75.
37. Raubitschek, H.—Zur Pathogenese der Pellagra, *Wein. Klin. Wochen.*, 1910, XXIII, pp. 963–990.
38. Valtorta, D.—Sulle alterazioni delle cellule nervose corticali in un caso di tifo pellagroso, 1908, N. 4 e 5.
39. Guyot, G.—Studi anatomo-patologici ed istologici sulla pellagra sperimentale, *Gazz. Degli Osped.*, Milan, 1908, XXIX, pp. 1033–1036.
40. Amabilino—Reperto anatoma-patologico in un caso di dimenza pellagrosa, *Riv. Pellag. Ital.* III, No. 4, 1903, p. 193.
41. Spiller and Anderson—*Am. J. of Med. Sciences*, new series, 141, Jan., June, 1911, p. 94.
42. Brugia cav.—L'Alterazioni del sistemi gangliari simpatico nella pazzia pellagrosa, *Riv. Sper. Pellag. Ital.*, II N. 3.
43. Verworn, M.—General Physiology, Lee's translation.
44. Duranti.—*Bull. dela Soc. Anat.*, Fevrier, 1910.
45. Stilling.—*Virchow Archive*, vol. 135, p. 470.
46. Mallory.—*Principles of Pathology*, 1914, p. 90.
47. Shattock.—*Trans. Path. Soc.*, London, Vol. LIV, 1903, p. 215.
48. Hoffmann.—*Zeitschr. f. Biol.*, vol. 8, 1872, p. 153.
49. Pettenkofer and Voigt.—*Liebig's Ann.*, 1862, Supl. Bd. 2, p. 52 and 361. (Adami.)
50. Taylor.—*Journal of Experimental Medicine*, Vol. IV, 1899, p. 399.
51. Rosenfeld—*Verhandl. d. deutsch. path. Gesellsch.*, vol. 6, 1904, p. 71.
52. Kaiserling and Orgler.—*Virchow's Archive*, vol. 167, 1902, p. 296.
53. Löhlein.—*Virchow's Archive*, vol. 180, 1905, p. 1.
54. Stewart.—*Manual of Physiology*, 7th ed., 1914, p. 620.
55. Funk.—*Journal of Physiology*, vols. 43, 44, 45, 1911, 1912.
56. Adami—*Principles of Pathology*, vol. 1. General Pathology, 2d ed., 1910, p. 872.
57. Siem.—Ueber die Wirkung des Aluminiums und des Berylliums auf den thierischen Organismus, Diss. Dorpat, 1886.
58. Von Doelken.—Ueber die Wirkung des Aluminiums, etc., *Arch. f. exper. Path. u. Pharm.*, XXXIX, 1897, p. 98.

59. Stieglitz.—Exper. Untersuchung über Bleivergiftung mit besonderer Berücksicht der Veränderungen am Nervensystem, Arch. f. Psychiatrie, Bd. XXIV, 1892.
60. Tirelli.—Sur l'anatomie pathologique des éléments nerveux dans l'empoisonnement aigu par le sublimé, Arch. ital. de Biologie, T. XXVI, 1896.
61. Tschisch.—Ueber Veränderungen des Rückenmarkes bei Vergiftung mit Morphin, Atropin Silbernitrat und Kaliumbromid, Virchow's Arch., Bd. C., 1885.
62. Babes, M. V.—La pathogenie de la pellagre, Bull De L'Academie de Med., XVIV, 1900, pp. 170-178.

EXPLANATION OF PLATES.

The illustrations are microphotographs of sections taken from various organs in the experimental animal series. Unless otherwise indicated, the sections were stained in hæmatoxylin and eosin.

Fig. 1. Monkey I: Spinal cord, cervical region, Pal Weigerts. Degeneration of the column of Burdach is marked.

Fig. 2. Monkey I: Spinal cord, dorsal region, Pal Weigerts. A diffuse unilateral marginal degeneration of all tracts is seen.

Fig. 3. Monkey I: Spleen, showing amyloidosis of the Malpighian nodules. The pulp is intensely congested. a. Amyloid in Malpighian areas.

Fig. 4. Monkey I: Ileum. This section shows: a. Erosion of superficial epithelium. b. Congestion of submucosa. c. Atrophic muscular layer; in some places it has almost disappeared.

Fig. 5. Monkey II: Liver. The lobules as well as the cell cords are broken up as a result of congestion and cirrhosis.

Fig. 6. Monkey IV: Liver. Portal vessels and intralobular capillaries are markedly congested. The cell cords are broken up into irregular islets.

Fig. 7. Monkey V: Small intestine. Beginning ulcer formation. a. Necrotic mass, consisting of an amorphous granular substance and fibrin. b. Area of cellular infiltration—polymorphonuclear leucocytes, erythrocytes, fibrin, plasma cells, and new connective tissue cells are seen in this area. c. Intensely congested submucosa; the entire mucosa is congested and inflamed; only the fundi of the crypts are seen.

Fig. 8. Monkey VI: Stomach. This section shows an ulcerous area of the mucosa; the surrounding mucosa is intensely congested and hemorrhagic. a. Necrotic substance and fibrin.

Fig. 9. Monkey VII: Heart. The muscle cells of the myocardium are vacuolated. Transverse striations are absent and sarcoplasm not affected by the vacuoles is granular.

Fig. 10. Rat I, Series I: Spleen. Unstained section after treating with potassium ferrocyanide and hydrochloric acid—Perl's test. a. Malpighian follicles unstained. b. Deep blue granules of hemosiderin.

Fig. 11. Monkey VIII: Cord, cervical region, showing degeneration in the column of Burdach. The negative of this photograph was retouched at the anatomical margin of the column. A mild diffuse degeneration is seen in the ground bundles of the anterior and lateral tracts. Technique, Pal Weigert's method.

Fig. 12. Monkey VII: Cord, dorsal region. In this section many fibers in the column of Goll are degenerated. A diffuse degeneration and sclerosis is seen throughout the white matter. The central canal is dilated. Technique, Pal Weigert's method.

Fig. 13. Monkey IV: Cerebrum. This section shows a large pyramidal cell with nucleus eccentrically placed. No Nissl's granules were present. Small vacuoles are seen in the cytoplasm. Technique, alcohol fixation, methylen blue.

Fig. 14. Monkey IX: Spinal cord, anterior horn motor cells. The cells are swollen; no Nissl's granules are present. Technique, alcohol fixation, methylen blue.



Fig. 1.



Fig. 2.

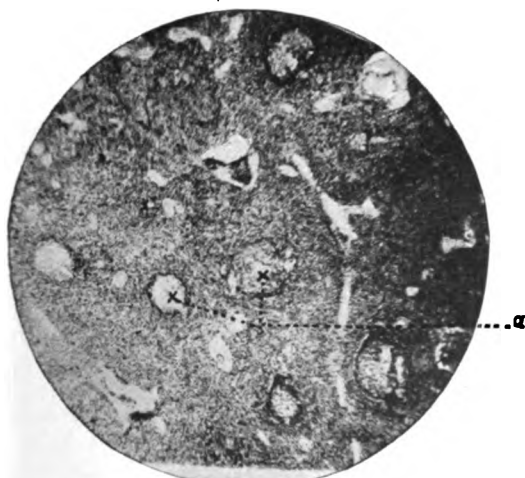


Fig. 3.

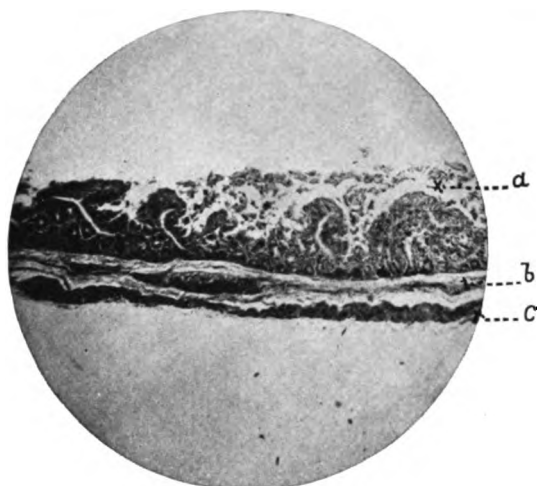


Fig. 4.



Fig. 5.



Fig. 6.

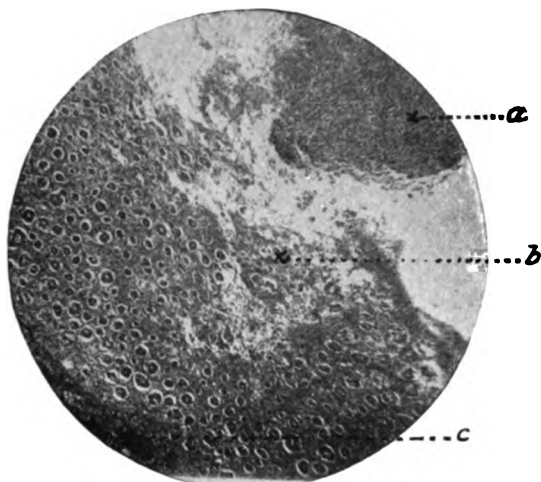


Fig. 7.

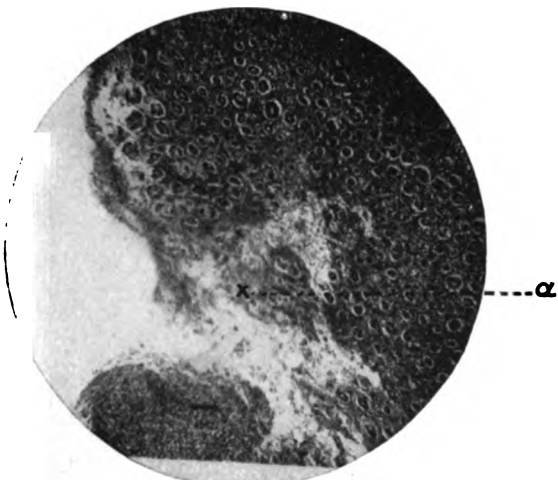


Fig. 8.

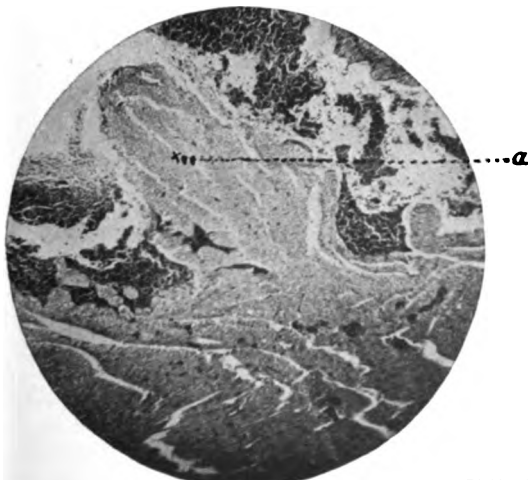


Fig. 9.

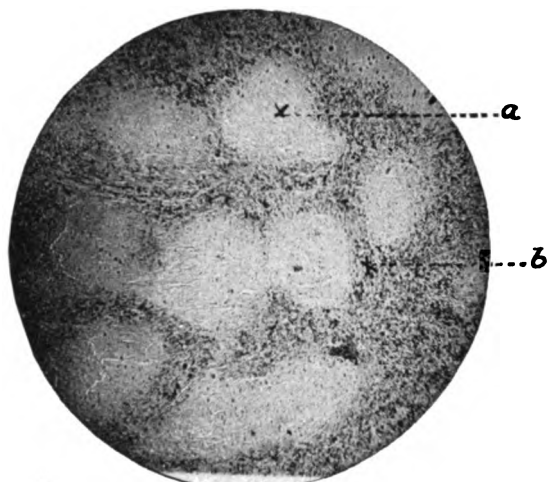


Fig. 10.



Fig. 11.



Fig. 12.

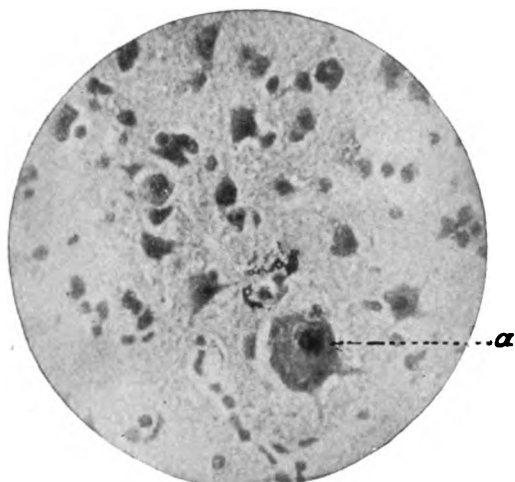


Fig. 13.

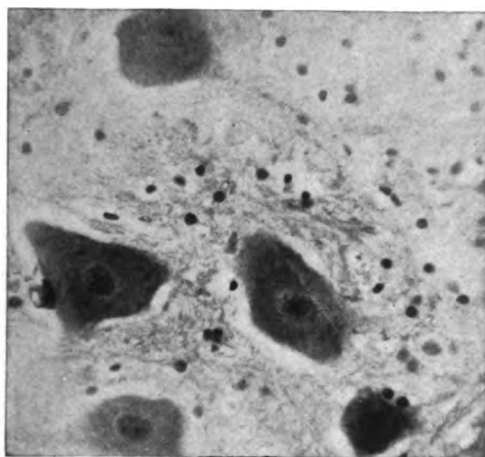


Fig. 14.

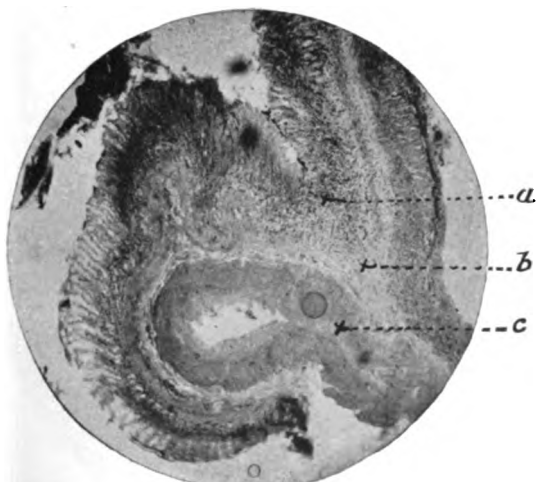


Fig. 15.

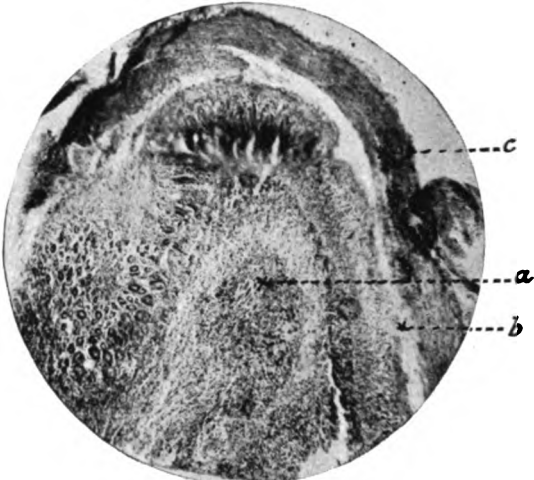


Fig. 16.

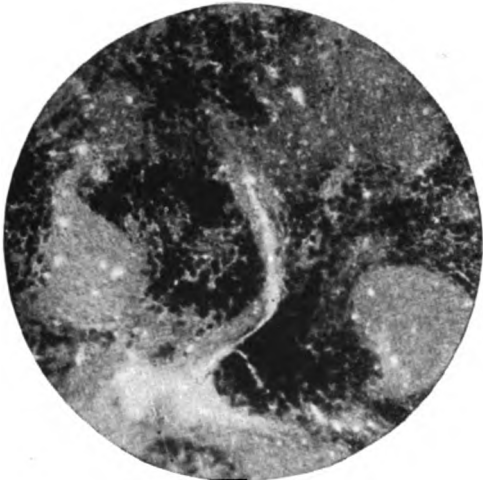


Fig. 17.



Fig. 18.

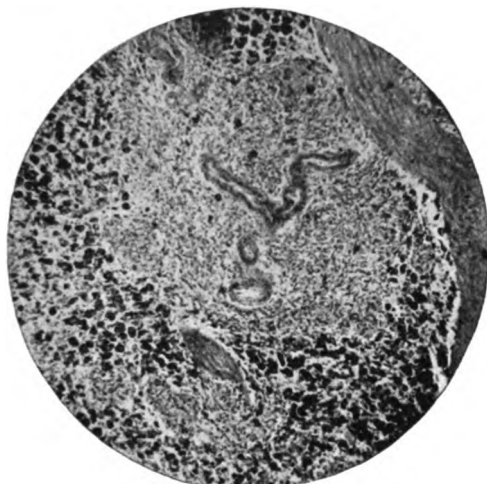


Fig. 19.

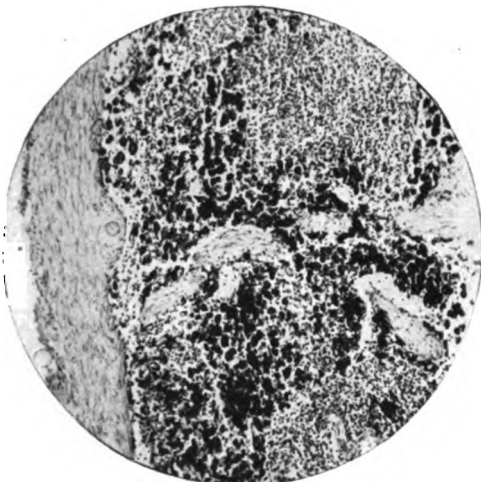


Fig. 20.

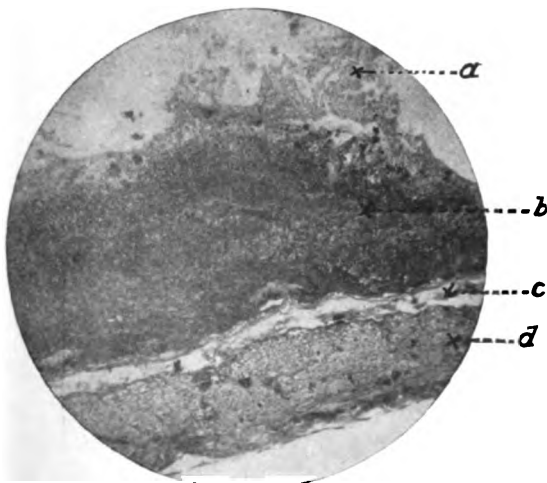


Fig. 21.



Fig. 15. Rat III, Series II: Stomach. This section shows the extensive changes that occur in starvation. All the epithelial cells of both the surface and gland crypts have disappeared. a. Plugs of mucin are seen between the connective tissue crypts. b. Submucosa and c. muscularis mucosae are necrotic.

Fig. 16. Rat III, Series II: Stomach, showing ulcer: a. Area of ulcer. b. Submucosa. c. Muscularis mucosae.

Fig. 17. Pig I: Spleen. Zenker's fixation—hæmatoxylin and eosin, showing extreme congestion and pigmentation.

Fig. 18. Pig I: Spleen. Unstained section after treating with potassium ferrocyanide and hydrochloric acid, Perl's test. The hemosiderin stands out prominently.

Fig. 19. Pig III: Spleen. Zenker's fixation, hæmatoxylin and eosin, showing extreme congestion and pigmentation.

Fig. 20. Pig III: Spleen. Perl's test. Much hemosiderin is seen.

Fig. 21. Rabbit I: Small intestine. a. Epithelium broken, eroded, and desquamated. b. Mucosa; hemorrhagic area filled with red blood cells; no traces of the glands of Lieberkühn are seen. c. Submucosa. d. Muscularis mucosae, showing hydropic degeneration and numerous vacuoles.

II. CULTIVATION EXPERIMENTS WITH THE BLOOD AND SPINAL FLUID OF PELLAGRINS.

By EDWARD FRANCIS, Surgeon, U. S. Public Health Service.

Anaërobic cultivation, somewhat after the method described by Noguchi for growing spirochaetae was carried out on the blood of 21 and on the spinal fluid of 16 pellagrins.

METHOD EMPLOYED.

This method of culture involves the use of fresh kidney tissue and ascitic fluid.

KIDNEY TISSUE.

A healthy rabbit is submerged and rubbed until his coat is well soaked in a solution of 5 per cent carbolic acid. While an assistant holds the rabbit vertically, grasping the front feet with one hand and the hind feet with the other, the operator, grasping the rabbit's larynx in his left hand and having a thin-bladed knife in his right hand, thrusts the blade through the soft tissues close to the bodies of the vertebræ and cuts outward, severing all the cervical vessels and surrounding tissues. In an instant the rabbit is dead. He is then quickly nailed to a board and the operator opens the abdominal cavity with an incision from manubrium to symphysis and tacks the abdominal walls to the board. An assistant then raises the lower end of the board until the intestines fall toward the chest, exposing the kidneys. With a sterile hemostatic forceps the operator grasps the kidney at its pelvis and pulls it forward; after the kidney is well raised from its bed it is best to clip the tough ureter with a sterile knife or scissors. The kidney, with forceps attached, is placed in a sterile, covered Petri dish, while the other kidney is similarly removed. With knife or scissors cut away the forceps, which takes away with it the fat of the pelvis. Strip off the capsule. Cut the kidney into 12 pieces. Transfer each piece to a sterile tube, 15 m. m. by 200 m. m., picking up the piece by touching it with a white-hot platinum wire and shaking it loose inside the tube; the tissue will stick to the side of the tube, but it is shaken down to the bottom as

you would the mercury in a thermometer. About 2 c. c. of sterile ascitic fluid is then added to each tube and they are allowed to incubate until the next day, when the infected ones are discarded.

ASCITIC FLUID.

My experience with ascitic fluids has not been large enough to justify a discussion of the subject. In this connection color, specific gravity, and bile content are to be considered. Some insist upon an initial specific gravity of at least 1.013 and a freedom from bile; some actually test for neither. Some say the straw-colored fluids are best, yet a greenish or bluish one has proven good. It is said that a fibrinous film in the fluid is essential, and that Berkefeld filtration ruins a fluid.

For my cultures of July 20 I used a straw-colored fluid having a specific gravity of 1.016. On August 5 I used a fluid of a slightly greenish tinge having a specific gravity of 1.020 and on test, an absence of bile. On August 17 I used a straw-colored fluid having a specific gravity of 1.014 and showing an absence of bile when tested.

SOURCE OF MATERIAL.

Blood and spinal fluid were obtained from each of 17 colored pellagrins (cases 1 to 17) at the State Insane Asylum, Milledgeville, Ga., seven of which proved fatal between 6 and 37 days after these materials were obtained. In addition, blood was obtained from 4 mild cases at the Marine Hospital, Savannah, Ga. I am indebted to Dr. W. F. Lorenz for obtaining the spinal fluid for me.

SEEDING.

Blood in 10 c. c. amounts was drawn from the median basilic vein by syringe and was either (a) discharged into a flask containing $\frac{1}{2}$ c. c. of a 10 per cent solution of citrate of sodium in saline solution (cases 1 to 11 and cases 19 to 21) or (b) discharged into an empty flask in which it was defibrinated with a platinum wire (cases 12 to 18).

SPINAL FLUID.

Spinal fluid obtained by lumbar puncture was allowed to drop from the needle in 10 to 20 c. c. amounts into glass-stoppered bottles.

As soon as collected, each sample of blood or spinal fluid was distributed into a set of eight culture tubes, no two tubes in the set receiving the same amount, but the amounts per tube varied from $\frac{1}{2}$ c. c. to 3 c. c.; in each tube there had been placed, 24 hours pre-

viously, a piece of fresh sterile rabbit kidney and 2 c. c of ascitic fluid.

To four of the set of tubes was then added a 4-inch column of ascitic fluid, while to the other four was added a similar column of a mixture of 1 part ascitic fluid and 2 parts of melted and cooled 1 per cent meat-infusion agar, titrated $+0.5$ to phenolphthalein. The agar used in culturing the blood and spinal fluid of cases 12 to 17 contained in addition 2 per cent glucose. A uniform mixture of the various materials in the tube was obtained by successively drawing them up into a pipette and expelling them again into the tube. Of each set, two tubes of the liquid media and two tubes of the solid media thus inoculated were each covered with a 1-inch column of sterile paraffin oil, while the other four tubes were left uncovered.

All tubes were then incubated without the use of special anaërobic apparatus at 37° C. for two or three weeks, at the end of which time examinations were made with the dark-field microscope.

The method of cultivation employed, furnished conditions of growth suitable for strict anaërobes, strict aërobes, and for facultative organisms of either group. Anaërobic conditions were most nearly approached around the kidney tissue at the bottom of the oil-covered tubes. To a less degree there was anaërobiosis at the bottom of the uncovered tubes. Conditions for aërobic growth were found on the surface of those tubes of media which were not covered with oil.

There were thus studied 8 culture tubes inoculated with 10 c. c. of blood drawn from each of 21 cases, and 8 culture tubes inoculated with 10 to 20 c. c. of spinal fluid drawn from each of 16 cases, making a total of 296 tubes examined.

RESULTS.

The results of the examination of the cultures were negative; the cultures either remained sterile or an occasional tube showed a growth which was evidently a contamination.

APPENDIX.

CASE NOTES.

Case 1.—L. W., colored female. On December 2, 1913, she had sore mouth, diarrhea and eruption on hands and feet.

Blood and spinal fluid cultured July 20, 1914.

Case 2.—R. B., colored female. On May 13, 1914, she had sore mouth, diarrhea, extensive moist eruption on hands and feet, and vaginitis.

Blood and spinal fluid cultured July 20, 1914.

Case 3.—L. G., colored female, admitted July 15, 1914, with sore mouth, diarrhea, moist eruption on hands, forearms, knees, and feet, and with vaginitis.

She died July 26, 1914.

Blood and spinal fluid cultured July 20, 1914.

Case 4.—B. K. S., colored female. On March 1, 1914, she had sore mouth, diarrhea, eruption on hands, feet, and neck.

Blood and spinal fluid cultured July 20, 1914.

Case 5.—K. H., colored female. On May 20, 1914, she had red tongue, diarrhea, and moist eruption on backs of hands and feet.

Blood and spinal fluid cultured July 20, 1914.

Case 6.—K. A., colored female, was admitted April 24, 1914; developed pellagra August 4, 1914, and died of pulmonary tuberculosis October 14, 1914.

Blood and spinal fluid cultured August 5, 1914.

Case 7.—C. H., colored female. On July 24, 1914, she had an eruption on hands, forearms, and feet.

Blood and spinal fluid cultured August 5, 1914.

Case 8.—J. B., colored male, was admitted August 27, 1913, with pellagra. He had a recurrence July 29, 1914, and died of same September 5, 1914.

Blood and spinal fluid cultured August 5, 1914.

Case 9.—J. W., colored male, was admitted with pellagra April 25, 1914, and died of same August 18, 1914.

Blood and spinal fluid cultured August 5, 1914.

Case 10.—K. A. C., colored female. On July 27, 1914, she had sore mouth and eruption on hands and feet.

Blood and spinal fluid cultured August 5, 1914.

Case 11.—J. C., colored male, was admitted July 1, 1914; developed pellagra August 4, 1914, and died of same September 12, 1914.

Blood cultured August 5, 1914.

Case 12.—C. F., colored female. On August 3, 1914, she had a moist eruption on backs of hands and between fingers.

Blood and spinal fluid cultured August 17, 1914.

Case 13.—J. M., colored female, was admitted with pellagra July 17, 1914, and died of same September 2, 1914.

Blood and spinal fluid cultured August 17, 1914.

Case 14.—I. M., colored female, was admitted with pellagra August 11, 1914. The disease was still active September 11, 1914.

Blood and spinal fluid cultured August 17, 1914.

Case 15.—E. D., colored female, was admitted with pellagra June 8, 1914, and died of same September 6, 1914.

Blood and spinal fluid cultured August 17, 1914.

Case 16.—A. O., colored male, was admitted April 8, 1914; developed pellagra August 8, 1914, and died of same September 12, 1914.

Blood and spinal fluid cultured August 17, 1914.

Case 17.—L. B., colored female, was admitted June 10, 1914; developed pellagra August 5, 1914, manifesting an eruption on the backs of the hands.

Blood and spinal fluid cultured August 17, 1914.

Case 18.—G. L. M., white male, age 40, was admitted to the Marine Hospital, Savannah, Ga., September 27, 1914, with red tongue, diarrhea, and an erythema on the backs of hands and fronts of wrists; complained of severe headaches and intense pains in his limbs; said he had attacks of pellagra in 1911 and in spring of 1914. He was discharged November 7, 1914, readmitted February 15, 1915, and again discharged September 11, 1915.

Blood cultured October 7, 1914.

Case 19.—W. H. A., white male, age 59, was admitted to the Marine Hospital October 8, 1914, with diarrhea. His first attack of pellagra was in May, 1914, when the backs of both hands and fronts of both wrists seemed to be sunburned and later peeled off. He was first seen July 29, 1914, at which time he had a very red tongue, but the erythema had nearly disappeared. He was discharged December 12, 1914.

Blood cultured July 29, 1914.

Case 20.—D. L. J., white male, age 40, was admitted to the Marine Hospital July 28, 1914, showing the remains of a dermatitis on the backs of the hands and around the neck. His first attack was in April, 1914. He was discharged 5 days after admission as he was not in need of hospital treatment.

Blood cultured July 29, 1914.

Case 21.—A. H. D., white male, age 65, was admitted to the Marine Hospital July 27, 1914, with an erythema on the backs of the hands and about both elbows. There was no diarrhea. His first attack began about two weeks before admission. He was discharged September 30, 1914.

Blood cultured July 27, 1914.

III. FURTHER ATTEMPTS TO TRANSMIT PELLAGRA TO MONKEYS.

By EDWARD FRANCIS, Surgeon, United States Public Health Service.

Systematic attempts on the part of the United States Public Health Service to infect monkeys with pellagra were begun in 1912 under the direction of Surg. C. H. Lavinder while in charge of pellagra investigations at the United States Marine Hospital, Savannah, Ga., assisted by Passed Asst. Surg. R. M. Grimm.

On account of the report by Harris,¹ of New Orleans, of the successful transmission of pellagra to a rhesus monkey, the scope of the work at Savannah was very much extended in July, 1913, and it was at that time that the writer became identified with the investigations. A short time later Dr. W. F. Lorenz, director of the Wisconsin Psychopathic Institute, Mendota, Wis., was engaged by the Public Health Service as a special expert for the study of the mental manifestations of the disease. While prosecuting his special studies at the State insane asylum, Milledgeville, Ga., he cooperated in some of the work here reported.

The studies of the above-named officers were reported² in September, 1914. Prior to this time, however, Drs. Lavinder and Grimm (in April) and Dr. Lorenz (by September 1) had discontinued their connection with the work.

In the above report, 74 rhesus monkeys and 3 baboons, after having been subjected to multiple inoculations in various ways with various kinds of pellagrous material from many pellagrins, were reported as healthy and showing no evidence that was considered as a pellagrous infection.

In the present paper the details of the animal inoculations begun by Drs. Lavinder and Grimm and continued and extended by the writer are submitted.

Details are presented as to the character of the pellagrous lesions manifested at autopsies from which inoculation material was obtained, the time intervals between death and autopsy and between autopsy and injection of animals, the kinds and amounts of pel-

¹ Harris: The Experimental Production of Pellagra in the Monkey, etc., *The Journal A. M. A.*, June 21, 1913, p. 1948.

² Lavinder, Francis, Grimm, and Lorenz: Attempts to Transmit Pellagra to Monkeys (*Journal A. M. A.*, 1914, September 26, Vol. LXIII, p. 1093).

lagrous materials used, and the method of injection and number of monkeys employed.

INJECTION OF NERVOUS TISSUE.

The brain, spinal cord, and their membranes were removed at eight autopsies, ground in a meat grinder, mixed with an equal volume of normal saline solution, and allowed to extract in the ice box for varying periods. The suspension was then squeezed through six thicknesses of gauze. The gauze filtrate was either injected into animals without further treatment or injected after filtration through a Berkefeld filter.

Gauze filtrate.—At autopsy No. 1, performed 3 hours after death, a gauze filtrate was prepared from the brain, spinal cord, and their membranes and was injected on July 30, 1913, 27 hours after death, intracerebrally (1 c. c.), intravenously (3 c. c.), and subcutaneously (4 c. c.) into rhesus No. 51, which died a year later, July 12, 1914, of tuberculosis. Rhesus No. 52 was injected with the same kind of material in the same amounts, in the same locations, and at the same time as was rhesus No. 51; this animal died 6 weeks later (Aug. 31, 1913) from cerebral abscess.

At autopsy No. 2, performed 1 hour after death, a gauze filtrate was prepared from the brain, spinal cord, and their membranes and injected August 18, 1913, 22 hours after death, intracerebrally (1 c. c.) and intravenously (5 c. c.) into rhesus No. 57, which died 2 months later (Oct. 26, 1913) from cerebral abscess.

At autopsy No. 3, performed 12 hours after death, a gauze filtrate was prepared from the brain, spinal cord, and their membranes and injected in one-half c. c. amounts daily intravenously into rhesus No. 19 for 4 consecutive days, the first injection being made 38 hours after death of the patient from which the autopsy material was obtained.

At autopsy No. 4, performed 8 hours after death, a gauze filtrate was prepared from the brain, spinal cord, and their membranes and injected October 29, 1913, 33 hours after death, intraspinally (1 c. c.) into rhesus No. 41. The same kind of material was injected 57 hours after death intravenously (2 c. c.) into rhesus No. 49.

At autopsy No. 8, performed 8 hours after death, a gauze filtrate was prepared from the brain, spinal cord, and their membranes and injected April 13, 1914, 58 hours after death, intraspinally in 4 c. c. amounts into rhesus monkeys Nos. 1, 2, 3, 5, 6, 25, 38, 45, 49, 61, and 62. Monkey No. 2 died 14 months later (June 24, 1915) from acute effects of injection of material of another kind; Nos. 25 and 38 died 10 months later (Feb. 18, 1915) of tuberculosis.

At autopsy No. 9, performed 5 hours after death, a gauze filtrate was prepared from the brain, spinal cord, and their membranes and injected May 27, 1914, 11 hours after death, into six monkeys. Rhesus monkeys Nos. 114, 115, 116, and 121 each received 2 c. c. intraspinally and 2 c. c. intraperitoneally; rhesus No. 119 received 1 c. c. intracerebrally and 1 c. c. intramuscularly; rhesus No. 120 received 1 c. c. intracerebrally and 1 c. c. intraperitoneally; monkey No. 114 died, 14 months after the inoculation, of tuberculosis; Nos. 119 and 120 died 13 months later from the acute effects of another inoculation.

At autopsy No. 10, performed 9 hours after death, a gauze filtrate was prepared from the brain, spinal cord, and their membranes and injected June 3, 1914, 14 hours after death, intracerebrally (1 c. c.) and intraperitoneally (1 c. c.) into rhesus monkey No. 123; intracerebrally (1 c. c.) and intramuscularly (1 c. c.) into rhesus No. 117.

Berkefeld filtrate.—At autopsy No. 8, performed 8 hours after death, a Berkefeld filtrate of the brain, spinal cord, and their membranes was prepared and injected April 13, 1914, 16 hours after death, intraspinally in 4 c. c. amounts into rhesus monkeys Nos. 26, 38, and 39. No. 38 died 10 months later (Feb. 19, 1915) of tuberculosis; No. 39 died 15 months later (July 31, 1915) from cause not apparent at autopsy.

At autopsy No. 6, performed 13½ hours after death, a Berkefeld filtrate was prepared from the brain, spinal cord, and their membranes and injected January 21 and January 22, 1914, 36 and 60 hours after death, intraspinally in 5 c. c. amounts at each time into rhesus No. 84. This animal died 15 months later (May 1, 1915) from tuberculosis.

The details of each of these experiments using brain, spinal cord, and their membranes are shown in the following table:

TABLE NO. 1.—*Injection of brain, spinal cord, and their membranes.*

(A) GAUZE FILTRATE.

Date of inoculation.	Source of material, autopsy.	Hours between death and autopsy.	Hours between autopsy and inoculation of animals.	Site of injection.	C. c. inoculated.	Monkey No.	Remarks.
1913.							
July 30	No. 1...	3	24	Cerebrum.....	1	Rhesus 51...	No. 51 died July, 1914. Tuberculosis.
				Vein.....	3		
				Subcutaneous.....	4		
Do..	No. 1...	3	24	Cerebrum.....	1	Rhesus 52...	No. 52 died August, 1913. Brain abscess.
				Vein.....	3		
				Subcutaneous.....	4		
Aug 18	No. 2...	1	21	Cerebrum.....	1	Rhesus 57...	{No. 57 died October, 1913. Brain abscess.
Oct. 13-14.	No. 3...	12	26 to 84	Vein.....	5		
Oct. 29	No. 4...	8	25	Spine.....	1	Rhesus 41...	
Oct. 30	No. 4...	8	49	Vein.....	2	Rhesus 49...	

TABLE NO. 1.—*Injection of brain, spinal cord, and their membranes*—Continued.

(A) GAUZE FILTRATE—Continued.

Date of inoculation.	Source of material, autopsy.	Hours between death and autopsy.	Hours between autopsy and inoculation of animals.	Site of injection.	C. C. inoculation.	Monkey No.	Remarks.
1914.							
Apr. 13	No. 8...	8	50	Spine.....	4	Rhesus 1, 2, 3, 5, 6, 25, 38, 45, 49, 61, and 62.	No. 2 died June, 1915, due to an injection. No. 25 died February, 1915. Tuberculosis. No. 38 died February, 1915. Tuberculosis.
May 27	No. 9...	5	6	Spine..... " eritoneum....	2	Rhesus 114, 115, 116, and 121.	No. 114 died July, 1915. Tuberculosis.
Do..	No. 9...	5	6	Cerebrum..... " muscle.....	1	Rhesus 119..	No. 119 died June, 1915, due to an injection.
Do..	No. 9...	5	6	Cerebrum..... " eritoneum....	1	Rhesus 120..	No. 120 died June, 1915, due to an injection.
June 3	No. 10..	9	5	Cerebrum..... " eritoneum....	1	Rhesus 123..	
Do..	No. 10..	9	5	Cerebrum..... " muscle.....	1	Rhesus 117..	

(B) BERKEFELD FILTRATE.

Jan. 21	No. 6...	13½	22½	Spine.....	5	Rhesus 84...	No. 84 died May, 1915. Tuberculosis.
Jan. 22	No. 6...	13½	46½	.....do.....	5		No. 38 died February, 1915. Tuberculosis.
Apr. 13	No. 8...	8	8	.....do.....	4	Rhesus 21, 38, and 39.	No. 39 died July, 1915, from cause not apparent at autopsy.

INJECTION OF BUCCAL, THORACIC, AND ABDOMINAL ORGANS EXCEPT INTESTINES.

At autopsy No. 8, performed eight hours after death, the buccal, thoracic, and abdominal contents, including tongue, salivary glands, tonsils, oesophagus, lungs, heart, diaphragm, stomach, liver, spleen, kidneys, omentum, and mesentery, but not including the intestines, were removed and all ground in a meat grinder. A portion of this material was treated with saline solution and allowed to stand in the ice box four hours, after which it was squeezed through gauze.

Gauze filtrate.—A portion of the gauze filtrate was injected (a) April 11, 1914, 16 hours after death, intravenously (1 c. c.) and subcutaneously (1 c. c.) into rhesus monkeys Nos. 41, 45, 47, and 49; (b) April 13, 1914, 60 hours after death, intravenously (9 c. c.) and subcutaneously (1 c. c.) into rhesus monkeys Nos. 32, 33, and 34. No. 32 died June 22, 1915, and No. 33 died March 7, 1915, both from tuberculosis. (See Table No. 2.)

Berkefeld filtrate.—Another portion of the gauze filtrate was passed through a Berkefeld filter and was injected April 11, 1914, 16 hours after death, intravenously (10 c. c.) into rhesus monkeys Nos. 27, 28, and 58. No. 58 died July 8, 1915, from the acute effects of an injection of another character.

These experiments are set forth in tabular form as follows:

TABLE No. 2.—Injection of buccal, thoracic, and abdominal organs, except intestines.**(A) GAUZE FILTRATE,**

Date of inoculation.	Source of material, autopsy.	Hours between death and autopsy.	Hours between autopsy and inoculation of animals.	Site of injection.	C. c. inoculated.	Monkey No.	Remarks.
1914.							
Apr. 11	No. 8...	8	8	{Vein..... {Subcutaneous.	1 1	{Rhesus 41, 45, 47, and 49.	
Apr. 13	No. 8...	8	52	{Vein..... {Subcutaneous.	9 1	{Rhesus 34...	
Do....	No. 8...	8	52	{Vein..... {Subcutaneous.	9 1	{Rhesus 32...	{No. 32 died June, 1915. Tuberculosis.
Do....	No. 8...	8	52	{Vein..... {Subcutaneous.	9 1	{Rhesus 33...	{No. 33 died Mar., 1915. Tuberculosis.

(B) BERKEFELD FILTRATE.

1914.							
Apr. 11	No. 8...	8	8	Vein.....	10	Rhesus 27, 28, and 53.	No. 58 died July, 1915, due to an injection.

INJECTION OF INTESTINES AND CONTENTS.

The intestines and fecal contents were removed at autopsies Nos. 1, 2, 3, 4, 6, 7, and 8, ground in a meat grinder, extracted with saline solution for approximately 10, 4, 12, 12, 12, 3, and 12 hours, respectively, and then squeezed through gauze. The gauze filtrates were either injected into animals without further treatment or injected after Berkefeld filtration.

Gauze filtrate.—A portion of the gauze filtrate from autopsy No. 2, performed 1 hour after death, was injected August 18, 1913, 22 hours after death, intravenously (2 c. c.) into java monkey No. 63, which died October 5, 1913, from cause not apparent at autopsy.

A portion of the gauze filtrate from autopsy No. 3, performed 12 hours after death, was injected October 13, 1913, 38 hours after death, intravenously (1 c. c.) into rhesus No. 21. This animal died March 16, 1914, from tuberculosis.

A portion of the gauze filtrate from autopsy No. 4, performed 8 hours after death, was injected (a) October 29, 1913, 36 hours after death, intravenously (2 c. c.) into rhesus monkeys 45 and 47. (b) November 4 and 8, 7 and 11 days, respectively, after death, intravenously (1 c. c. each time) into rhesus No. 25. This animal died February 18, 1915, from tuberculosis.

A portion of the gauze filtrate from autopsy No. 6, performed 13½ hours after death, was injected (a) January 21, 1914, 36 hours after death, intravenously (2 c. c.) into rhesus monkeys 85 and 86. (b) January 22, 1914, 60 hours after death, intravenously (2 c. c.) into rhesus monkeys Nos. 85 and 86.

A portion of the gauze filtrate from autopsy No. 7, performed 3 hours after death, was injected February 4, 1914, 8 hours after death, intravenously (1 c. c.) into rhesus No. 91.

Berkefeld filtrate.—A portion of the gauze filtrate from autopsy No. 1, performed 3 hours after death, was passed through a Berkefeld filter and injected July 30, 1913, 27 hours after death, intracerebrally (1 c. c.), intravenously (12 c. c.), and subcutaneously (3 c. c.) into rhesus No. 53.

A portion of the gauze filtrate from autopsy No. 2, performed 1 hour after death, was passed through a Berkefeld filter and injected August 18, 1913, 22 hours after death, intracerebrally (1 c. c.) and intravenously (7 c. c.) into baboon No. 64.

A portion of the gauze filtrate from autopsy No. 8, performed 8 hours after death, was passed through a Berkefeld filter and injected (a) April 12, 1914, 36 hours after death, intravenously (9 c. c.) and subcutaneously (1 c. c.) into each of rhesus monkeys Nos. 1, 2, 3, 5, 6, and 62. No. 2 died June 24, 1915, from the acute effects of an injection of other material. (b) April 13, 1914, 60 hours after death, intravenously (9 c. c.) and subcutaneously (1 c. c.) into rhesus monkeys Nos. 36, 37, 39, and 40. No. 39 died July 31, 1915, from cause not apparent at autopsy. (c) April 18, 1914, 1 week after death, intravenously (9 c. c.) and subcutaneously (1 c. c.) into rhesus monkeys Nos. 1, 2, 3, and 5. As above recorded, No. 2 died from the acute effects of an injection of other material.

Feces collected at autopsy No. 2 on August 17 were passed through a Berkefeld filter on August 18, and 15 c. c. of the filtrate were injected between August 18 and September 17, 1913, intravenously into female baboon No. 66, in amounts not to exceed 1 c. c. in any one day.

These experiments are set forth in tabular form as follows:

TABLE NO. 3.—*Injection of intestines and contents.*
(A) GAUZE FILTRATE.

Date of inoculation.	Source of material, autopsy.	Hours between death and autopsy.	Hours between autopsy and inoculation of animals.	Site of injection.	C. c. inoculated.	Monkey No.	Remarks.
1913. Aug. 18	No. 2...	1	21	Vein.....	2	Java 63.....	No. 63 died Oct. 5, 1913, from cause not apparent at autopsy. No. 21 died Mar. 16, 1914, tuberculosis. No. 25 died Feb. 16, 1915, tuberculosis.
Oct. 13	No. 3...	12	26	.....do.....	1	Rhesus 21...	
Oct. 29	No. 4...	8	28	.....do.....	2	Rhesus 45 and 47.	
Nov. 4	No. 4...	8	160	.....do.....	1	Rhesus 25...	
Nov. 8	No. 4...	8	256	.....do.....	1	Rhesus 25...	
1914. Jan. 21	No. 6...	13½	22½	.....do.....	2	Rhesus 85 and 86.	
Jan. 22	No. 6...	13½	46½	.....do.....	2	.....do.....	
Feb. 4	No. 7...	3	5	.....do.....	1	Rhesus 91...	

TABLE No. 3.—*Injection of intestines and contents*—Continued.

(B) BERKEFELD FILTRATE.

Date of inoculation.	Source of material, autopsy.	Hours between death and autopsy.	Hours between autopsy and inoculation of animals.	Site of injection.	C. C. inoculated.	Monkey No.	Remarks.
1913.							
July 30	No. 1...	3	24	{Cerebrum..... Vein..... Subcutaneous.	1 12 3	Rhesus 53...	
Aug. 18	No. 2...	1	21	{Cerebrum..... Vein.....	1 7	Baboon 64 ..	
Aug. 18 to Sept. 17	No. 2...	1	.....	Vein.....	15	Baboon 66..	
1914.							
Apr. 12	No. 8...	8	28	{Vein..... Subcutaneous.	9 1	Rhesus 1, 2, 3, 5, 6, and 62.	No. 2 died June 24, 1915, due to an injection.
Apr. 13	No. 8...	8	52	{Vein..... Subcutaneous.	9 1	Rhesus 36, 37, 39, and 40.	No. 39 died July 31, 1915, from cause not appar- ent at autopsy.
Apr. 18	No. 8...	8	160	{Vein..... Subcutaneous.	9 1	Rhesus 1, 2, 3, and 5.	No. 2 died June 24, 1915, due to an injection.

INJECTION OF SKIN.

Skin, showing the pellagrous lesions, obtained from five autopsies, was ground in a meat grinder, treated with saline solution, and squeezed through gauze. A portion was used for inoculation without further treatment; another portion was first passed through a Berkefeld filter.

Gauze filtrate.—A portion of the gauze filtrate from autopsy No. 1, performed 3 hours after death, was injected July 30, 1913, 27 hours after death, intracerebrally (1 c. c.), intravenously (5 c. c.), and subcutaneously (3 c. c.) into rhesus No. 54, which died February 11, 1914, from tuberculosis.

A portion of the gauze filtrate from autopsy No. 2, performed 1 hour after death, was injected August 18, 1913, 22 hours after death, intracerebrally (1 c. c.) and intravenously (4 c. c.) into Java monkey No. 59, which died October 9, 1913, from oesophagostomum infection.

A portion of the gauze filtrate from autopsy No. 3, performed 12 hours after death, was injected (a) October 13, 1913, 38 hours after death, intravenously (1 c. c.) into rhesus No. 17, which died October 26, 1915, from cause not apparent at autopsy; (b) October 13 to 17 intravenously (1 c. c. daily) into rhesus No. 18.

A portion of the gauze filtrate from autopsy No. 4, performed 8 hours after death, was injected October 29, 1913, 36 hours after death, intravenously (2 c. c.) and subcutaneously (1 c. c.) into rhesus monkeys Nos. 38, 39, and 40. No. 38 died February 19, 1915, from tuberculosis. No. 39 died July 31, 1915, from cause not apparent at autopsy.

A portion of the gauze filtrate from autopsy No. 6, performed 13½ hours after death, was injected January 21, 1914, 36 hours after death, intravenously (2 c. c.) into rhesus No. 87.

Berkefeld filtrate.—A portion of the gauze filtrate from autopsy No. 2, performed 1 hour after death, was filtered through a Berkefeld filter and injected August 18, 1913, 22 hours after death, intracerebrally (1 c. c.), intravenously (9 c. c.), and subcutaneously (5 c. c.) into rhesus monkeys Nos. 61 and 62.

These experiments are set forth in tabular form as follows:

TABLE No. 4.—*Injection of skin.*

(A) GAUZE FILTRATE.

Date of inoculation.	Source of material, autopsy	Hours between death and collection of autopsy material.	Hours between collection of material and inoculation of animals.	Site of injection.	C. c. inoculated.	Monkey No.	Remarks.
1913.							
July 30	No. 1...	8	24	Cerebrum.....	1	Rhesus 54...	No. 54 died Feb., 1914; tuberculosis.
				Vein.....	5		
				Subcutaneous.	3		
Aug. 18	No. 2...	1	21	Cerebrum.....	1	Java 59.....	No. 59 died Oct. 9, 1913; oesophagostomum.
				Vein.....	4		
Oct. 13	No. 3...	12	26	Vein.....	1	Rhesus 17...	No. 17 died Oct. 26, 1915, from cause not apparent at autopsy.
Oct. 13-17	No. 3...	12	.....	Vein.....	1 (daily)	Rhesus 18...	
Oct. 29	No. 4...	8	28	Vein.....	2	Rhesus 38... 39 and 40...	No. 38 died Feb., 1915, tuberculosis. No. 39 died July, 1915, from cause not apparent at autopsy.
				Subcutaneous.	1		
1914.							
Jan. 21	No. 6...	13½	22½	Vein.....	2	Rhesus 87...	

(B) BERKEFELD FILTRATE.

1913.							
Aug. 18	No. 2...	1	21	Cerebrum.....	1	Rhesus 61 and 62.	
				Vein.....	9		
				Subcutaneous.	5		

INJECTION OF BLOOD.

Blood was drawn from the median basilic veins of eight pellagrins (cases 1 to 8) and after being either defibrinated or citrated was immediately injected.

The condition of the pellagrins from whom the blood was obtained may be stated briefly as follows:

Cases 1, 3, and 4 were severe but nonfatal white males, showing marked eruptions and diarrhea at the time of bleeding.

Case 2 at the time of bleeding showed no eruption but was very much disordered mentally.

Cases 5, 6, 7, and 8 were colored females, showing marked skin lesions and diarrhea at the time of bleeding. They died 10, 33, 13,

and 7 days, respectively, after the date on which their blood was drawn.

Defibrinated blood.—Blood was drawn from case 1 on August 26, 1913, and after defibrination was injected intravenously (8 c. c.) into rhesus No. 68. Blood was drawn from case 2 September 29, 1913, and after defibrination was injected intravenously (8½ c. c.) into the same monkey. No. 68 died January 8, 1914, from tuberculosis.

Blood was drawn from case 3 June 6, 1914, and after defibrination was injected intraspinally (5 c. c.) and intramuscularly (10 c. c.) into each of two rhesus monkeys, Nos. 85 and 86.

Citrated blood.—Thirty-five c. c. of blood were drawn from case 4 on June 6, 1914, and mixed with 0.3 c. c. of a 10 per cent solution of citrate of sodium, after which 10 c. c. were injected intramuscularly into each of three rhesus monkeys, Nos. 10, 72, and 76. No. 10 died June 19, 1915, from the acute effects of an injection of other material. No. 76 died July 26, 1915, from tuberculosis.

Mixed blood.—Twenty c. c. of blood were drawn from cases 5, 7, and 8 each on May 20, 1914, each into 0.2 c. c. of 10 per cent citrate of sodium. The same amount at the same time was drawn from case 6 and was defibrinated. The four bloods were then mixed and the mixture was injected intravenously (6 c. c.) and intraperitoneally (6 c. c.) into each of rhesus monkeys Nos. 72, 76, 85, and 86, and intraperitoneally (10 c. c.) into No. 10. No. 10 died June 19, 1915, from the acute effects of an injection of other material.

These experiments are set forth in tabular form as follows:

TABLE No. 5.—*Injection of blood.*

(A) DEFIBRINATED.

Date of injection.	Pellagrics who furnished the blood.	Site of injection.	C. c. inoculated.	Monkey No.	Remarks.
1913. Aug. 26 Sept. 29	Case 1... Case 2...	Vein..... .....do.....	8 8½	Rhesus 68..... .....do.....	No. 68 died Jan. 8, 1914. Tuberculosis.
1914. June 6	Case 3...	Spine..... muscle.....	5 10	Rhesus 85 and 86.	

(B) CITRATED.

June 6	Case 4...	Muscle.....	10	Rhesus 10, 72, and 76.	No. 10 died June, 1915, due to an injection. No. 76 died July, 1915. Tuberculosis.
--------	-----------	-------------	----	------------------------	--

(C) DEFIBRINATED OR CITRATED, MIXED.

May 20	Case 5...	Vein.....	6	Rhesus 72, 76, 85, and 86.	No. 76 died July, 1915. Tuberculosis.
	Case 6...	Peritoneum.	6		
	Case 7...	Peritoneum.	10	Rhesus 10.....	No. 10 died June, 1915, due to an injection.
	Case 8...				

INJECTION OF CEREBROSPINAL FLUID COLLECTED AT AUTOPSY.

Not filtered.—Spinal fluid collected at autopsy No. 2, performed 1 hour after death, was injected August 18, 1913, 22 hours after death, without filtration, intracerebrally (1 c. c.) and intravenously (5 c. c.) into rhesus No. 58, which died July 8, 1915, from the acute effects of an injection of another character.

Spinal fluid collected at autopsy No. 4, performed 8 hours after death, was injected August 28, 1913, 15 hours after death, without filtration, intraspinally (1 c. c.) into rhesus No. 26, intraspinally (2 c. c.) into rhesus No. 27, intraspinally (3 c. c.) into rhesus No. 28, intraspinally (4½ c. c.) into rhesus No. 58.

Spinal fluid collected at autopsy No. 6, performed 13½ hours after death, was injected January 20, 1914, 12 hours after death, without filtration, intraspinally (5 c. c.) into rhesus No. 80.

Berkefeld filtrate.—Spinal fluid collected at autopsy No. 7, performed 3 hours after death, was injected February 4, 1914, 8 hours after death, after filtration through a Berkefeld filter, intraspinally (5 c. c.) into rhesus monkeys Nos. 26, 27, 28, and 58.

Spinal fluid collected at autopsy No. 8, performed 8 hours after death, was injected April 11, 1914, 12 hours after death, after filtration through a Berkefeld filter, intraspinally (5 c. c.) into rhesus monkeys Nos. 32, 33, 34, 35, 36, and 37. Nos. 32 and 33 died June 22, 1915, and March 7, 1915, respectively, from tuberculosis.

These experiments are set forth in tabular form as follows:

TABLE NO. 6.—*Injection of cerebrospinal fluid collected at autopsy.*

(A) NOT FILTERED.

Date of injection.	Source of material. Autopsy.	Hours between death and collection of autopsy material.	Hours between collection of material and injection of animals.	Site of injection.	C. c. inoculated.	Monkey No.	Remarks.
1913.							
Aug. 18	No. 2...	1	21	Cerebrum.....	5	58	No. 58 died July, 1915, due to an injection.
				Vein.....	5	58	
Oct. 28	No. 4...	8	7	Spine.....	1	26	
Do....	No. 4....	8	7	.....do.....	2	27	
Do....	No. 4....	8	7	.....do.....	3	28	
Do....	No. 4....	8	7	.....do.....	4½	58	No. 58 died (see above).
1914.							
Jan. 20	No. 6...	13½	3½	.....do.....	5	80	

(B) BERKEFELD FILTRATE.

Feb. 4	No. 7...	3	5	Spine.....	5	Rhesus 26, 27, 28, and 58.	No. 58 died July, 1915, due to an injection.
Apr. 11	No. 8...	8	4	.....do.....	5	Rhesus 32, 33, 34, 35, 36, and 37.	No. 32 died June, 1915. Tuberculosis. No. 33 died March, 1915. Tuberculosis.

INJECTION OF SPINAL FLUID COLLECTED DURING LIFE.

Spinal fluid collected during life from 28 pellagrins (cases 29 to 54 and cases 3 and 4) was injected without filtration immediately after collection, in amounts of 5 c. c. or more intraspinally into 24 rhesus monkeys, 1 receiving 5 injections of approximately 5 c. c. each, another receiving 4 such injections, another receiving 3 injections, 16 others receiving 2 injections, and 5 others receiving only 1 injection each.

Brief data as to symptoms manifested by pellagrins from whom spinal fluid was drawn will be found by reference to case numbers in the case notes.

Twenty-three of the pellagrins who furnished spinal fluid (cases 29 to 51) were colored females at the State insane asylum, Milledgeville, Ga. Pellagrins 52, 53, 54, 3, and 4 were white males at the Marine Hospital, Savannah, Ga.

Dr. W. F. Lorenz drew the fluid from all these patients and injected the monkeys while conducting for the Public Health Service his studies upon the mental manifestations of the disease.

Of the 24 monkeys inoculated, all are still well¹ except 6; 5 of the 6 lived over a year following their last injection and died from causes plainly other than the spinal injections, while the sixth died from tuberculosis six and one-half months after his last injection.

These experiments are set forth in tabular form as follows:

TABLE NO. 7.—*Injection of spinal fluid drawn during life.*

Date of injection.	Case No. of pellagrin who furnished spinal fluid.	Site of injection.	C. C. injected.	Rhesus monkey No.	Remarks.
1914.					
Apr. 14	29	Spine...	6	98.....	
May 2	30	do.....	4	98.....	
Apr. 14	31	do.....	6	99.....	
May 2	32	do.....	5	99.....	
May 7	33	do.....	4	99.....	
May 19	34	do.....	7	99.....	
May 30	35	do.....	5	99.....	
Apr. 20	36	do.....	6	100.....	No. 100 died December, 1914; tuberculosis.
May 2	37	do.....	4	100.....	
May 19	38	do.....	6	100.....	
May 30	39	do.....	5	100.....	
Apr. 17	40	do.....	8	101.....	No. 101 died June, 1915, due to an injection.
May 19	38	do.....	5	101.....	
May 30	35	do.....	5	101.....	
May 19	41	do.....	5	107.....	
May 30	39	do.....	5	107.....	
May 19	41	do.....	5	108.....	
May 30	42	do.....	5	108.....	
May 19	34	do.....	6	109.....	
May 30	42	do.....	5	109.....	
June 12	43	do.....	9	102.....	
July 10	44	do.....	5	102.....	
June 12	45	do.....	8	103.....	

¹ At time this report was written, December, 1915.

TABLE NO. 7.—*Injection of spinal fluid drawn during life—Continued.*

Date of injection.	Case No. of pellagrin who furnished spinal fluid.	Site of injection.	C. C. injected.	Rhesus monkey no.	Remarks.
1914.					
July 10	46	Spine....	5	101.....	
June 12	47	...do.....	8	101.....	
July 10	44	...do.....	5	101.....	
June 12	48	...do.....	6	103.....	No. 105 died October, 1915, from cause not apparent at autopsy.
July 10	42	...do.....	5	103.....	
June 12	49	...do.....	7	101.....	
July 10	50	...do.....	5	103.....	
June 12	51	...do.....	8	110.....	
July 10	46	...do.....	5	110.....	
May 13	52	...do.....	5	19, 23, and 58.	No. 58 died July, 1915, due to an injection.
May 13	53	...do.....	5	23, 27, 80, and 84.	No. 84 died May, 1915; tuberculosis.
May 13	54	...do.....	5	71, 73, 81, and 82.	No. 82 died July, 1915, due to an injection.
June 2	3	...do.....	9	71, 81, and 82.	No. 82 died. (See above.)
June 2	4	...do.....	9	23, 27, and 80.	

INJECTION OF PERICARDIAL FLUID.

Pericardial fluid collected at autopsy No. 6, performed 13½ hours after death, was injected without filtration January 20, 1914, 17 hours after death, intravenously (10 c. c.), and injected in 10 c. c. amounts intravenously daily thereafter for four days into two rhesus monkeys, Nos. 81 and 82. No. 82 died July 2, 1915, from the acute effects of an injection of other material.

A portion of the pericardial fluid collected at autopsy No. 6 was passed through a Berkefeld filter and injected January 23 and January 26, three and six days, respectively, after death, intraspinally in 5 c. c. amounts each time into rhesus monkeys Nos. 71 and 73.

INJECTION OF URINE.

Urine from four pellagrins, cases 9, 10, 11, and 12, each of whom showed a marked indican reaction, was injected intravenously after Berkefeld filtration into five rhesus monkeys. All urine injected had been passed within 24 hours.

Case 9 was acute, showing skin eruption. Case 10 was in his fourth yearly attack, presenting eruption on both forearms. Case 11 was in his third attack and manifested an eruption on elbows and hands. Case 12 was a severe fatal case, with sore mouth, diarrhea, and marked wet lesions on both hands and wrists.

The mixed urine of cases 9, 10, and 11 was injected between November 26 and December 8, 1913, in daily amounts of either 10 c. c. or 20 c. c. intravenously into rhesus monkeys Nos. 10, 72, and 76, and in total amounts, respectively, of 130 c. c., 155 c. c., and 155 c. c.

The mixed urine of cases 9 and 12 was injected between April 8

and 13, 1914, in daily amounts of either 10 c. c. or 20 c. c., intravenously, into rhesus monkeys Nos. 10, 76, 93, and 94, each receiving, respectively, 85 c. c., 115 c. c., 90 c. c., and 105 c. c. Rhesus No. 10 died June, 1915, from an injection of other material; No. 76 died July, 1915, from tuberculosis; No. 93 died March, 1915, from monkey birth.

These experiments are set forth in tabular form as follows:

TABLE No. 8.—*Injection of Berkefeld filtrate of urine.*

Date of injection.	Pellagrins who furnished the urine.	Site of injection.	Total c. c. injected.	Monkey No.	Remarks.
1913.					
		Vein....	130	Rhesus 10...	No. 10 died June, 1915, due to an injection of other material.
Nov. 26 to Dec. 8.	Cases 9, 10, and 11 mixed...	..do....	155	Rhesus 76...	No. 76 died July, 1915; tuberculosis.
		..do....	155	Rhesus 72...	
1914.		..do....	105	Rhesus 94...	
Apr. 8-13...	Cases 9 and 12 mixed.....	..do....	85	Rhesus 10...	No. 10 died. (See above.)
		..do....	115	Rhesus 76...	No. 76 died. (See above.)
		..do....	90	Rhesus 93...	No. 93 died March, 1915, from monkey birth.

INJECTION OF FECES.

Feces from pellagrins (cases 13, 14, and 15), after Berkefeld filtration, were injected intraperitoneally into 26 rhesus monkeys. All three cases at the time of stool filtration were passing through acute severe nonfatal attacks, accompanied by erythema and diarrhea.

Diarrheal stools, free from urine, collected morning and evening from cases 13, 14, and 15 were subjected daily to filtration through paper with the use of a Buchner filter and a vacuum, but without the use of a diluent. The paper filtrates were passed through Berkefeld filters, letter N, without the use of a diluent and the mixed sterile filtrates were injected daily between June 17 and 23, 1915, intraperitoneally, using 10 c. c. for the first injection and 20 c. c. for subsequent injections into each of 26 rhesus monkeys. Ten of this number died from acute peritonitis within a week from their last injection. Three others died from tuberculosis 30, 42, and 104 days, respectively, after their last injection. Two died from causes not apparent at autopsy. The remaining 11, aside from some depression following the injections, have remained well. The numbers of the 11, and total amount of undiluted fecal filtrate received by each of them, are as follows:

No. 1, 90 c. c.; No. 3, 110 c. c.; No. 13, 110 c. c.; No. 19, 40 c. c.; No. 37, 60 c. c.; No. 78, 40 c. c.; No. 91, 60 c. c.; No. 98, 100 c. c.; No. 99, 130 c. c.; No. 108, 60 c. c.; No. 109, 60 c. c.

These experiments are set forth in tabular form as follows:

TABLE NO. 9.—*Injection of Berkefeld filtrate of feces.*

Date of injection.	Source of material.	Site of injection.	Total c. c. injected.	Monkey No.	Remarks.
1915. June 17-23	Feces of pellagrins, cases 13, 14, and 15, mixed.	Peritoneum...	90	1	Still well Nov. 26, 1915.
			110	3	Do.
			110	13	Do.
			40	19	Do.
			60	37	Do.
			40	78	Do.
			60	91	Do.
			100	98	Do.
			130	99	Do.
			60	108	Do.
			60	109	Do.
			120	17	Died Oct. 26, 1915, from cause not apparent at autopsy.
			130	97	Died Oct. 5, 1915; tuberculosis.
			130	111	Died Sept. 18, 1915, from cause not apparent at autopsy.
			60	77	Died Aug. 4, 1915; tuberculosis.
			80	24	Died July 21, 1915; tuberculosis.
			60	2	
			90	9	
			30	10	
			50	11	
			90	14	
			90	58	
			90	82	
			110	101	
			70	119	
			110	120	
					2, 9, 10, 11, 14, 58, 82, 101, 119, and 120 all died from peritonitis within a week from their last injection.

INTRANASAL APPLICATION OF UNTREATED FECES.

Feces from cases 16, 17, and 18 were engaged on cotton pledgets in the nasal fossæ of 29 rhesus monkeys. Case 16 was a fatal case with diarrhea, presenting at autopsy loosened epidermis on backs of both hands and fronts of both wrists, roughened skin over the ridge of nose, red tongue, foul mouth, and liquid feces.

Case 17 was a nonfatal case in his first attack, with erythema on both hands and elbows; no diarrhea.

Case 18 was in his first attack, manifesting erythema of hands, sore mouth, and diarrhea.

On September 12, 1914, at the autopsy of case 16, the small and large intestines from the pyloric end of the stomach to the anus, including the liquid contents, were removed in one piece and placed in the ice box until September 17, on which date the entire intestinal tract was laid open with a scissors and the mucous membrane was scraped throughout with a dull edge. The liquid fecal contents and the scrapings were removed and placed in the ice box until September 18, when two-thirds of the case 16 material was mixed with a fresh stool from case 17. This fecal mixture was applied on September 18 to the nasal fossæ of rhesus monkeys Nos. 8, 9, 14, 38, 76, 81, 82, 98, 99, 100, 101, 104, 105, 106, 107, 115, 116, 117, 119, 120, and 123.

On September 19 the remaining one-third of the case 16 material was mixed with a fresh stool from case 18 and applied to the nasal fossæ of monkeys Nos. 28, 72, 103, 108, 109, 110, 114, and 121.

Of the 31 monkeys which received intranasal application of feces, 17 have remained well; the other 12, Nos. 8, 9, 14, 38, 76, 82, 100, 101, 105, 114, 119, and 120, died from causes evidently other than the intranasal applications.

The infectivity of feces on the conjunctiva was also tested.

FEEDING OF SPUTUM.

Sputum collected fresh each day from 10 spitting pellagrins was fed by stomach tube to 5 rhesus monkeys, Nos. 9, 14, 16, 23, and 77, each receiving between 25 c. c. and 100 c. c. at a feeding, and receiving a total of 3,630 c. c., 1,650 c. c., 2,220 c. c., 1,580 c. c., and 915 c. c., respectively.

Rhesus No. 9 was fed in November, 1913, with 700 c. c. sputum from case 19; in February, 1914, with 1,030 c. c. from cases 23 and 24; in March, 1914, with 1,900 c. c. from cases 23, 24, and 12; total, 3,630 c. c. Rhesus No. 9 died June 28, 1915, from the acute effects of an injection of other material.

Rhesus No. 14 was fed in November, 1913, with 300 c. c. sputum from case 22 and 350 c. c. from case 21; in March, 1914, with 1,000 c. c. from case 12; total, 1,650 c. c. Rhesus No. 14 died June 23, 1915, from the acute effects of an injection of other material.

Rhesus No. 16 was fed in November, 1913, with 980 c. c. from case 25; in December, 1913, with 200 c. c. from case 25; in March, 1914, with 1,040 c. c. from case 12; total, 2,220 c. c.

Rhesus No. 23 was fed in November, 1913, with 365 c. c. from case 20 and 300 c. c. from case 26; in December, 1913, with 115 c. c. from case 20; in March, 1914, with 800 c. c. from case 12; total, 1,580 c. c.

Rhesus No. 77 was fed in November, 1913, with 680 c. c. from case 11, and in December, 1913, with 235 c. c. from case 11; total, 915 c. c. Rhesus No. 77 died August 4, 1915, from tuberculosis.

The principal symptoms manifested by pellagrins at the time they furnished the sputum for feeding were the following:

Case 19. Sore mouth and diarrhea; eruption on hands, elbows, and neck.

Case 20. Sore mouth and diarrhea; eruption on hands and elbows.

Case 21. Sore mouth; scaly eruption on elbows and hands.

Case 22. Sore mouth and red tongue; eruption on hands.

Case 23. Sore mouth and eruption on hands.

Case 24. Red tongue and diarrhea.

Case 25. Red tongue, sore mouth, and eruption on hands.

Case 26. Sore mouth and diarrhea; scaly eruption on arms and legs.

Case 11. Eruption on elbow and hands; burning sensation in feet; indigestion.

Case 12. Red tongue, sore mouth, and diarrhea; eruption on hands, wrists, nose, and face; burning sensation of feet.

These experiments are set forth in tabular form as follows:

TABLE No. 10.—*Feeding of sputum.*

Date of feeding.	Source of sputum.	C. c. fed.	Monkey number.	Remarks.
November, 1913.....	Case 19.....	703	9	No. 9 died June 23, 1915, from the acute effects of an injection.
February, 1914.....	Cases 23 and 24.....	1,030	9	
March, 1914.....	Cases 23, 24, and 12.....	1,900	9	
November, 1913.....	Case 21.....	350	14	No. 14 died June 23, 1915, from the acute effects of an injection.
March, 1914.....	Case 22.....	300	14	
November, 1913.....	Case 12.....	1,000	14	
December, 1913.....	Case 25.....	980	16	
March, 1914.....	do.....	230	16	
November, 1913.....	Case 12.....	1,040	16	
December, 1913.....	Case 21.....	363	23	
March, 1914.....	Case 26.....	330	23	
November, 1913.....	Case 20.....	115	23	
March, 1914.....	Case 12.....	803	23	No. 77 died Aug. 4, 1915. Tuberculosis.
November, 1913.....	Case 11.....	680	77	
December, 1913.....	do.....	235	77	

FEEDING OF PELLAGROUS TISSUES.

At autopsy No. 3, performed 12 hours after death, the stomach and contents, the large and small intestines and contents, pancreas, spleen, mesentery, and mesenteric glands were removed, ground in a meat grinder, placed in the ice box, and fed by tube into the empty stomachs of rhesus monkeys Nos. 1, 2, 3, 4, 5, 6, 8, and baboon 66. The feedings were made daily from October 14 until the material was exhausted, October 28, 1913. No. 2 died June 24, 1915, from the acute effects of an injection. No. 4 died April 15, 1914; autopsy showed marked congestion of brain and cord. No. 8 died February 23, 1915, from tuberculosis.

At autopsy No. 4, performed 8 hours after death, the stomach and contents, large and small intestines and contents, pancreas, spleen, portion of liver, kidney, mesentery, and mesenteric lymph glands were removed, ground in a meat grinder, placed in the ice box, and fed by tube into the empty stomachs of rhesus monkeys Nos. 1, 2, 3, 4, 5, 6, 8, 29, 31, 32, 33, 34, 35, 36, 37, and baboons 65 and 66. The feedings were daily from October 29 to November 6, 1913. Nos. 2, 4, and 8 died from causes indicated above. No. 29 died November 26, 1913, from cause not apparent at autopsy. No. 31 died February, 1914, from cause not apparent at autopsy. No. 32 died June 22, 1915, from tuberculosis. No. 33 died March 7, 1915, from tuberculosis. Baboon No. 65 died June 2, 1914, from cause not apparent at autopsy.

At autopsy No. 5, performed 9 hours after death, the stomach and contents and the large and small intestines and contents were removed, ground in a meat grinder, placed in the ice box, and fed by tube into the empty stomachs of rhesus monkeys Nos. 1, 2, 3, 4, 5, 6, 8, and baboon 65. The feedings were daily from December 29, 1913, to January 3, 1914. Nos. 2, 4, 8, and 65 died from causes indicated above.

At autopsy No. 6 performed 13½ hours after death the entire contents of the buccal, thoracic, and abdominal cavities were removed, the tissues being divided only at their bony attachments. This mass of organs was ground in a meat chopper, placed in the ice box, and fed by tube into the empty stomachs of rhesus monkeys Nos. 1, 2, 3, 4, 5, 6, 8, 31, 32, 33, 34, 35, 36, 37, and baboons 65 and 66. Nos. 2, 4, 8, 32, 33, and 65 died from causes indicated above. The feedings were daily from January 21 to 28, 1914.

On January 29 the same animals were fed in the same way with the entire brain and spinal cord and portions of the ulnar and sciatic nerves from autopsy No. 6, which had been kept since January 20 in the ice box.

At autopsy No. 7 performed three hours after death the entire brain, spinal cord, and their membranes were removed, ground in a grinder, placed in the ice box, and fed by tube on February 5, 1914, into the empty stomachs of rhesus monkeys Nos. 1, 2, 3, 4, 5, 6, 8, 32, 33, 34, 36, 37, 95, 96, and baboon 64. Nos. 2, 4, 8, 32, and 33 died from causes indicated above.

The entire contents of the buccal and thoracic cavities, leaving only the denuded bony surfaces, were prepared and treated as was the nervous tissue, and fed to the same animals February 6.

The entire contents of the abdominal cavity, excepting stomach, small intestines, large intestines, and feces, but including liver, spleen, kidneys, omentum, mesentery, uterus, ovaries, lymph glands, etc., were stripped out complete, ground, and kept cool, as was the nervous tissue, and fed to the same animals on February 7 and 9.

The stomach, small intestines, and large intestines, after stripping out their contents, were ground and kept cool, as was the nervous tissue, and fed to the same animals on February 10.

At autopsy No. 8 performed eight hours after death the entire brain, spinal cord, and their membranes were removed, ground in a meat grinder, placed in the ice box, and fed on April 13, 1914, by tube into the empty stomachs of rhesus monkeys Nos. 11, 13, 17, 18, 19, 26, 27, 28, 32, 33, 34, 35, 36, 37, 53, 58, 95, 96, and baboon 65. No. 11 died July 2, 1915, from the acute effects of an injection. No. 58 died July 8 1915, from the acute effects of an injection. No. 17 died October, 1915, from cause not apparent at autopsy. Nos. 32, 33, and 65 died from causes indicated above.

These experiments are given in tabular form as follows:

TABLE No. 11.—*Feeding of pellagrous tissues.*

Date of feeding.	Source of material; autopsy.	Hours between death and collection of autopsy material.	Material used for feeding.	Monkey No.	Remarks.
1913. Oct. 14-23.....	No. 3.....	12	Stomach and contents, large intestines and contents, small intestines and contents, pancreas, spleen, mesentery, mesenteric glands.	Rhesus 1, 2, 3, 4, 5, 6, 8, and baboon 66.	No. 2 died June, 1915, due to an injection. No. 4 died April, 1914, from cause not apparent at autopsy. No. 8 died February, 1915; tuberculosis.
Oct. 29-Nov. 6....	No. 4.....	8	Stomach and contents, large intestines and contents, small intestines and contents, pancreas, spleen, portion of liver, one kidney, mesentery, mesenteric glands.	Rhesus 1, 2, 3, 4, 5, 6, 8, 29, 31, 32, 33, 34, 35, 36, 37, and baboons 65 and 66.	No. 29 died November, 1913, from cause not apparent at autopsy. No. 31 died February, 1914, from cause not apparent at autopsy. No. 32 died June, 1915; tuberculosis.
Dec. 29-Jan. 3....	No. 5.....	9	Stomach and contents, large intestines and contents, small intestines and contents.	Rhesus 1, 2, 3, 4, 5, 6, 8, and baboon 65.	No. 33 died March, 1915; tuberculosis. No. 65 (baboon) died June, 1914, from cause not apparent at autopsy.
1914. Jan. 21-29.....	No. 6.....	13½	Entire contents of buccal, thoracic and abdominal cavities.	Rhesus 1, 2, 3, 4, 5, 6, 8, 31, 32, 33, 34, 35, 36, 37, and baboons 65 and 66.	
Jan. 29.....	No. 6.....	13½	Entire brain and spinal cord and portions of the ulnar and sciatic nerves.	.....do.....	
Feb. 5.....	No. 7.....	8	Brain, spinal cord and their membranes.	Rhesus 1, 2, 3, 4, 5, 6, 8, 32, 33, 34, 36, 37, 95, 96, and baboon 64.	
Feb. 6.....	No. 7.....	.....	Entire contents of buccal and thoracic cavities.	.....do.....	
Feb. 7 and 9.....	No. 7.....	.....	Entire contents of abdominal cavity except stomach, intestines, and their contents.	.....do.....	
Feb. 10.....	No. 7.....	.....	Stomach, large and small intestines without contents.	.....do.....	
Apr. 13.....	No. 8.....	8	Brain, spinal cord and their membranes.	Rhesus 11, 13, 17, 18, 19, 26, 27, 28, 32, 33, 34, 35, 36, 37, 53, 58, 95, 96, and baboon 65.	No. 11 died July, 1915, due to an injection. No. 53 died July, 1915, due to an injection. No. 17 died October, 1915, from cause not apparent at autopsy.

FEEDING OF PELLAGROUS TISSUES AND SPOILED CORN MEAL.

At autopsy No. 8, performed eight hours after death, the entire contents of the buccal, thoracic, and abdominal cavities were removed en masse, ground in a meat grinder, placed in the ice box, and fed by tube April 14, 15, 16, and 17, 1914, into the empty stomachs of

rhesus monkeys Nos. 11, 13, 17, 18, 19, 26, 27, 28, 32, 33, 34, 35, 36, 37, 53, 58, 95, 96, and baboon 65, each receiving a daily feeding consisting of 70 c. c. of tissue and 20 grams of spoiled corn meal.

Nos. 11, 17, 32, 33, 58, and 65 died from causes indicated above.

FEEDING OF FECES AND SPOILED CORN MEAL.

Diarrheal feces collected at autopsy No. 7 from all parts of the large and small intestines were kept in the ice box from February 4, 1914, the day of the autopsy, to February 11, and daily feedings, beginning February 5, were made by tube into the stomachs of rhesus monkeys Nos. 93 and 94, using for each animal at each feeding 70 c. c. of feces and 20 grams of spoiled corn meal. Rhesus No. 93 died March 29, 1915, from monkey birth.

Diarrheal feces collected fresh each day from a pellagrin who became autopsy No. 8 were mixed with spoiled corn meal and fed by tube daily into the empty stomachs of monkeys from March 11, 1914, to April 3, 1914, using for each animal at each feeding 70 c. c. of feces and 20 grams of spoiled corn meal. Fifteen such feedings were made into each of monkeys Nos. 93, 94, 1, 2, 3, and 4; three such feedings were made into Nos. 6 and 8. Nos. 2, 4, 8, and 93 died from causes indicated above.

SUMMARY.

The opinion of some workers that pellagra is a specific infectious disease, and the report by Harris, of New Orleans, of the production of pellagra in the monkey by the injection of a Berkefeld filtrate of pellagrous tissues, led the United States Public Health Service as a part of its study of pellagra to attack exhaustively the problem of the infectivity of pellagrous tissues and body fluids for the rhesus monkey.

The experiments here reported consist of a series of inoculations and feedings of pellagrous tissues and fluids into 90 rhesus monkeys, 3 baboons, and 1 Java monkey. The experiments were begun at the United States Marine Hospital, Savannah, Ga., in July, 1913; were continued through 1914, and were completed in June, 1915.

Throughout this period the experimental animals were bountifully fed and were kept under daily observation in cages in a glass-covered conservatory, located on the south side of the hospital and freely exposed to the direct rays of the sun.

The sources of the pellagrous material with which the animals were inoculated or fed were 10 autopsies and 50 living pellagrins, the protocols of which appear in Appendix I.

In all, 252 experiments were made with material collected during life or at autopsy; in 141 of these, inoculation was made by hypo-

dermic needle; in 82, material was fed by stomach tube; in 29, feces were applied to the nasal mucosa.

With few exceptions each animal was inoculated by more than one route, with two or more kinds of material, from more than one case, and on more than one occasion.

Twenty-eight animals were each subjected to a single experiment; 19 were each subjected to 2 experiments; 17 were subjected to 3 experiments each; 19 were subjected to 4 each; 7 were subjected to 5 each; and 4 were subjected to 6 experiments each.

The material used for inoculation or feeding was disposed of as follows:

(a) The brain, spinal cord, and their membranes were removed at 8 autopsies, ground in a meat grinder, extracted with saline solution, filtered through gauze, and injected cerebrally, venously, and subcutaneously into 2 rhesus monkeys, cerebrally and venously into 1, cerebrally and muscularly into 2, cerebrally and peritoneally into 2, spinally and peritoneally into 4, spinally into 12, and venously into 2, and after Berkefeld filtration, were injected spinally into 4.

(b) The buccal, thoracic, and abdominal organs except intestines were removed at one autopsy, ground in a meat grinder, extracted with saline solution, filtered through gauze, and injected venously and subcutaneously into 7 rhesus monkeys, and after Berkefeld filtration, were injected venously into 3 rhesus monkeys.

(c) The intestines and fecal contents were removed at 7 autopsies, ground in a meat grinder, extracted with saline solution, squeezed through gauze, and injected venously into 7 rhesus monkeys and 1 Java monkey, and after Berkefeld filtration, were injected cerebrally, venously, and subcutaneously into 1 rhesus monkey, cerebrally and venously into 1 baboon, venously into 1 baboon, venously and subcutaneously into 10 rhesus monkeys.

(d) Skin showing the pellagrous lesions was removed at 5 autopsies, ground in a meat grinder, extracted with saline solution, filtered through gauze, and injected cerebrally, venously, and subcutaneously into 1 rhesus monkey, cerebrally and venously into 1 Java monkey, venously and subcutaneously into 3 rhesus monkeys, venously into 3, and after Berkefeld filtration, was injected cerebrally, venously, and subcutaneously into 2 rhesus monkeys.

(e) Blood drawn from 8 pellagrins was, after defibrination, injected venously into 1 rhesus monkey and spinally and muscularly into 2; after citration was injected muscularly into 3; or the mixed defibrinated and citrated blood was injected venously and peritoneally into 4 rhesus monkeys and peritoneally into 1.

(f) Cerebrospinal fluid collected at 5 autopsies was injected cerebrally and venously into 1 rhesus monkey and spinally into 5; or

after Berkefeld filtration, was injected spinally into 10 rhesus monkeys.

(g) Spinal fluid collected during life from 28 pellagrins was injected without filtration immediately after collection in amounts of 5 c. c. or more intraspinally into 24 rhesus monkeys, 1 receiving 5 injections of approximately 5 c. c. each, another receiving 4 such injections, another receiving 3 injections, 16 others receiving 2 injections, and 5 others receiving only 1 injection each.

(h) Pericardial fluid collected at one autopsy was injected without filtration venously into 2 rhesus monkeys and after filtration was injected spinally into 2 rhesus monkeys.

(i) Urine from 4 pellagrins, giving a marked indican reaction, was injected after Berkefeld filtration venously into 5 rhesus monkeys, each receiving, respectively, 270 c. c., 215 c. c., 155 c. c., 105 c. c., and 90 c. c.

(j) Feces from 3 pellagrins with marked diarrhea were, after Berkefeld filtration, injected peritoneally into 26 rhesus monkeys in amounts from 40 to 130 c. c. each of undiluted fecal filtrate.

(k) Feces from 1 autopsy and from 2 pellagrins were introduced on cotton pledgets into the nasal fossæ of 29 rhesus monkeys.

(l) Sputum collected fresh each day from 10 spitting pellagrins was fed by stomach tube to 5 rhesus monkeys in total amounts, respectively, of 3,630 c. c., 1,650 c. c., 2,220 c. c., 1,580 c. c., and 915 c. c.

(m) The brain, spinal cord, and their membranes collected at 2 autopsies, after being ground, were fed by a stomach tube to 25 rhesus monkeys and 2 baboons.

(n) The entire contents of the buccal and thoracic cavities collected at 2 autopsies, after being ground, were fed by stomach tube to 16 rhesus monkeys and 3 baboons.

(o) The entire contents of the abdominal cavity collected at 4 autopsies, after being ground, were fed by stomach tube to 17 rhesus monkeys and 3 baboons.

(p) The entire contents of the buccal, thoracic, and abdominal cavities were removed at one autopsy, and after being ground and mixed with spoiled corn meal were fed by stomach tube to 18 rhesus monkeys and 1 baboon.

(q) Feces collected at one autopsy were mixed with spoiled corn meal and fed by stomach tube to 2 rhesus monkeys.

(r) Feces collected fresh each day from a fatal case of pellagra with diarrhea were mixed with spoiled corn meal and fed by tube daily for 15 days to 6 rhesus monkeys and daily for 3 days to 2 others.

A summary of all the individual experiments on each monkey is contained in Appendix II.

RESULTS.

Of the 94 animals here reported upon, 54 are living and 40 are dead.¹ Eighteen of the latter died of tuberculosis; 10 died of acute peritonitis following peritoneal injections; 2 died of cerebral abscess following cerebral injection; 1 died of œsophagostomum; 1 female died in labor; while 8 died from causes which could not be determined at the autopsy.

With one exception the surviving animals have shown no indications even suggesting pellagra. The exception referred to is as follows:

Rhesus No. 98 was injected intraspinally on April 14, 1914, with 6 c. c. of spinal fluid drawn from a fatal case of pellagra three days before death. This animal was again injected intraspinally on May 2, with 4 c. c. of spinal fluid drawn from another fatal case of pellagra 24 hours before death. The first change in this monkey was noted May 4, 1914, at which time the right forearm appeared slightly swollen and looked as if some of the hair was falling out. The following day the left forearm showed a similar condition. Later both forearms became entirely denuded of hair, the skin became roughened and scaly, and large cracks yielded a slight serous exudate. Over both wrists the superficial skin seemed to be denuded and the condition gave the appearance of superficial ulceration. On the posterior surface of each hand a similar condition was noticed; the knuckles were swollen and reddish and presented cracks and broken skin. On May 9 the skin was dry and scaly. The bowel movements were occasionally loose (soft). Later thick crusts on the skin came away, leaving a pale and slightly scaly surface. By June 15, 1914, the only abnormal condition present was an absence of hair over the parts affected. Later the hair returned and the animal appeared and has remained normal in every way.

In interpreting the skin manifestations of rhesus No. 98 the evidence points to their being accidental rather than to their being of a pellagrous origin. This animal was one of 24 which received spinal injections of spinal fluid collected from 28 pellagrins during life; it was one of 19 which received two or more injections of spinal fluid. Rhesus No. 99 received five injections of spinal fluid collected from five cases, two of which were fatal; rhesus No. 100 received four injections of spinal fluid collected from four cases, three of which were fatal; rhesus No. 101 received three injections of spinal fluid from three cases, one of which was fatal. No other monkey was injected with spinal fluid from the particular pellagrins who furnished the fluid for the inoculations of rhesus No. 98.

The work here reported furnishes no support for the view that pellagra is an infectious disease.

¹ At time this report was written, December, 1915.

APPENDIX I.

SOURCE AND DISPOSAL OF INOCULATING MATERIAL.

1. CASE NOTES.

Case 1.—E. J. S., white male, age 34, was admitted to the Marine Hospital August 12, 1913, with a skin eruption affecting both forearms and elbows, with sore mouth, diarrhea, and burning sensations in the feet. His first attack was in April, 1913. He was discharged November 10, 1913.

(a) Blood was drawn from the median basilic vein August 26, 1913, and after defibrination was injected intravenously (8 c. c.) into rhesus 68.

Case 2.—O. H., white male, age 27, was admitted to the Marine Hospital September 25, 1913. He was mentally so disordered that no connected history was obtainable; he had to be restrained in bed. Discharged September 30; insane.

(a) Blood was drawn from the median basilic vein September 29, 1913, and after defibrination was injected intravenously (8½ c. c.) into rhesus 68.

Case 3.—C. N. D., white male, age 38, was admitted to the Marine Hospital May 24, 1914, with severe dermatitis on the backs of hands and wrists and on face and neck, and with diarrhea. His first attack was in March, 1914. He was discharged July 3, 1914.

(a) Blood was drawn from the median basilic vein June 6, 1914, and after defibrination was injected intraspinally (5 c. c.) and intramuscularly (10 c. c.) into each of rhesus monkeys 85 and 86.

(b) Spinal fluid was collected June 2, 1914, and injected spinally into rhesus 71, 81, and 82.

Case 4.—W. T. D., white male, age 37, was admitted to the Marine Hospital May 27, 1914, with diarrhea and erythema on the backs of hands and wrists and on the nose and forehead. His first attack was in February, 1914. He was discharged July 23, 1914.

(a) Blood was drawn from the median basilic vein June 6, 1914, into citrate solution, after which 10 c. c. was injected intramuscularly into each of rhesus monkeys 10, 72, and 76.

(b) Spinal fluid was collected June 2, 1914, and injected spinally into rhesus 26, 27, and 80.

Case 5.—A. G., colored female, age 59, was admitted to the Georgia Infirmary May 12, 1914, with erythema on the hands, arms, and neck. She died May 30, 1914.

(a) Twenty c. c. of blood were drawn from cases 5, 7, and 8 on May 20, 1914, each into citrate solution. The same amount was drawn at the same time from case 6 and was defibrinated. The four bloods were then mixed and the mixture was injected intraperitoneally (6 c. c.) and intravenously (6 c. c.) into each of rhesus monkeys 72, 76, 85, and 86, and intraperitoneally (10 c. c.) into rhesus 10.

Case 6.—O. J., colored female, age 34, was admitted to the Georgia Infirmary May 19, 1914, with diarrhea and an erythema affecting the hands, forearms, and neck. Her first attack was in March, 1914. She died June 22, 1914.

(a) Furnished blood. (See case 5.)

Case 7.—M. P., colored female, age 33, was admitted to the Georgia Infirmary May 18, 1914, with diarrhea and with erythema affecting the hands, forearms, neck, and face. Her first attack was in May, 1913. She died June 3, 1914. (See autopsy No. 10.)

(a) Furnished blood. (See case 5.)

Case 8.—P. T. was a colored female, age 35, admitted to the Georgia Infirmary May 9, 1914, with diarrhea and with an erythema on the hands and forearms. Her first attack was in April, 1913. She died May 27, 1914. (See autopsy No. 9.)

(a) Furnished blood. (See case 5.)

Case 9.—F. D. M., white male, age 20, was admitted to the Marine Hospital November 8, 1913, with a scaly eruption on the face, neck, and elbows and with sore mouth. His first attack began in October, 1913. He was discharged December 24, 1913; readmitted March 24, 1914; and again discharged June 14, 1914.

(a) The mixed urine of cases 9, 10, and 11 was injected between November 26 and December 8, 1913, in daily amounts of either 10 c. c. or 20 c. c. intravenously into rhesus 10, 72, and 76, and in total amounts, respectively, of 130 c. c., 155 c. c., and 155 c. c.

(b) The mixed urine of cases 9 and 12 was injected between April 8 and 13, 1914, in daily amounts of either 10 c. c. or 20 c. c. intravenously into rhesus monkeys 10, 76, 93, and 94, each receiving, respectively, 85 c. c., 115 c. c., 90 c. c., and 105 c. c.

Case 10.—M. P. T., white male, age 56, was admitted to the Marine Hospital December 1, 1913. His present attack began in June, 1913, with an eruption on the hands and with diarrhea. On admission his symptoms had very much subsided. He was discharged December 13, 1913.

(a) Furnished urine. (See case 9.)

Case 11.—J. F. B., white male, age 54, was admitted to the Marine Hospital November 4, 1913, with a scaly eruption on the elbows and backs of hands, with sore tongue, and constipation. His present attack began in September, 1913. He had attacks in 1911 and 1912. He was discharged December 24, 1913.

(a) Furnished urine. (See case 9.)

(b) Furnished 680 c. c. sputum in November, 1913, and 235 c. c. in December, 1913, for feeding rhesus 77.

Case 12.—C. R., white male, age 51, was admitted to the Marine Hospital March 7, 1914, with sore mouth, diarrhea, eruption on the neck and backs of hands, and burning sensation of the feet. His first attack was in February, 1914, and was continuous until death, April 11, 1914. (See autopsy No. 8.)

(a) Furnished urine. (See case 9.)

(b) In March, 1914, furnished sputum for feeding monkeys, 800 c. c. for No. 23, 1,040 c. c. for No. 16, 1,000 c. c. for No. 14, some for No. 9.

(c) Feces collected fresh each day from March 11 to April 3 were mixed with spoiled corn meal and fed to rhesus monkeys 93, 94, 1, 2, 3, 4, 6, and 8.

Case 13.—J. P., white male, age 31, was admitted to the Marine Hospital June 16, 1915, with diarrhea, red tongue, ulcers at corners of mouth, and roughened skin on the backs of both hands and on forearms. The present attack began six weeks previously with diarrhea. His first attack occurred in the spring of 1914 and was accompanied by diarrhea; there was a fall attack

in 1914 characterized by an eruption on the hands, which the patient said was due to "blistering by the sun." Patient was discharged September 8, 1915.

(a) Feces collected morning and evening between June 17 and 23, 1915, from cases 13, 14, and 15 were after Berkefeld filtration injected intraperitoneally into 28 rhesus monkeys. (See table No. 9.)

Case 14.—C. C., colored male, age 28, was admitted to the Marine Hospital June 15, 1915, with the following symptoms: A pigmented collar 3 inches wide encircles the neck and extends downward 1 inch behind and downward 3 inches in front. The backs of both hands and all fingers present purplish blebs, and there is ulceration between the fingers. The condition extends upward for 2 inches on the lower third of the forearms. Both feet show purplish discoloration and blebs on all parts except the soles. There is red tongue, sore lips, marked ptyalism, and marked diarrhea. Patient is well nourished. His first attack was five weeks before admission. He was discharged August 18, 1915.

(a) Furnished feces. (See case 13.)

Case 15.—H. O. W., white male, age 44, was admitted to the Marine Hospital June 6, 1915, with marked bilateral erythema of both hands extending to a sharp line of demarcation 1 inch above the wrists. The right elbow was red. There was marked diarrhea and burning sensations in the feet. The present attack began in February, 1915, with diarrhea and eruption on the hands. In 1913 he had an eruption extending from his fingers to his shoulders, which lasted through March and April and required bandaging. He was discharged September 25, 1915.

(a) Furnished feces. (See case 13.)

Case 16.—C. S., colored female, age 35, was admitted to the Georgia Infirmary September 10, 1914, presenting a red tongue, foul mouth, and bad diarrhea. The backs of the hands and fronts of the wrists showed the epidermis loosely adherent covering the moist red derma. The nose showed the usual rough comedone appearance. She died September 12, 1914.

(a) Furnished feces at autopsy which, with feces from cases 17 and 18, were applied to the nasal fossae of 29 monkeys. (See intranasal application of feces.)

Case 17.—A. H. D., white male, age 65, was admitted to the Marine Hospital July 27, 1914, with an erythema on the backs of the hands and about both elbows. There was no diarrhea. His first attack began about two weeks before admission. He was discharged September 30, 1914.

(a) Furnished feces. (See intranasal application of feces.)

Case 18.—W. L. T., white male, age 41, was admitted to the Marine Hospital August 29, 1914, with erythema of backs of hands, forearms, and lower two-thirds of arms, with sore mouth and diarrhea. His first attack was in April, 1914. He was discharged October 13, 1914, readmitted October 25, 1914, and again discharged February 1, 1915.

(a) Furnished feces. (See intranasal application of feces.)

Case 19.—J. S., white female, age 38, was admitted to the Savannah Hospital November 6, 1913, with sore mouth, diarrhea, scaly eruption on neck, face, and elbows, and erythema on backs of hands. The present attack began in October, 1913, and was her first. Patient was discharged February 25, 1914.

(a) Furnished 700 c. c. sputum in November, 1913, for feeding rhesus 9.

Case 20.—J. W., white male, age 43, was admitted to the Marine Hospital November 1, 1913, with scaly eruption on both hands and elbows, sore mouth, and uncontrollable diarrhea. The present attack began in August, 1913. His first attack was in 1910; his second was in 1912. He died at the Marine Hospital December 27, 1913. At times during his last three weeks he exhibited mental depression and excitement. (See autopsy No. 5.)

(a) Furnished 365 c. c. sputum in November, 1913, and 115 c. c. in December for feeding rhesus 23.

Case 21.—A. T. D., white female, age 25, was admitted to the Savannah Hospital November 8, 1913, with sore mouth and scaly eruption on backs of hands and elbows. The present attack began in September, 1913, and was continuous with her first attack, which was in June, 1913. She was discharged December 8, 1913.

(a) Furnished 350 c. c. sputum in November, 1913, for feeding rhesus 14.

Case 22.—F. T., colored female, age 32, was admitted to the Georgia Infirmary October 29, 1913, with very sore mouth, constipation, and scaly eruption on backs of hands and elbows. Her first attack was in May, 1913, and continued through the summer. She died at the Georgia Infirmary January 21, 1914.

(a) Furnished 300 c. c. sputum in November, 1913, for feeding rhesus 14.

Case 23.—J. S. E., white male, age 38, was admitted to the Marine Hospital February 2, 1914, with erythema on backs of hands and roughness on backs of elbows. His first attack was in October, 1911. This was followed by attacks in 1912 and 1913. He was discharged February 28, 1914.

(a) Furnished sputum in February and March, 1914, for feeding rhesus 9.

Case 24.—W. P. F., white male, age 25, was admitted to the Marine Hospital February 9, 1914, with red tongue and diarrhea. He was discharged August 16, 1914.

(a) Furnished sputum in February and March, 1914, for feeding rhesus 9.

Case 25.—J. H. S., white male, age 62, was admitted to the Marine Hospital October 21, 1913, with red tongue, sore mouth, and eruption on backs of hands. His present attack began in May, 1913. His first attack was in August, 1911. He was discharged July 2, 1913.

(a) Furnished 980 c. c. sputum in November, 1913, and 200 c. c. in December for feeding rhesus 16.

Case 26.—Mrs. K., white female, age 58, was admitted to the Savannah Hospital November 8, 1913, with a scaly eruption on the backs of the hands and forearms, with burning sensations in the feet, sore mouth, and diarrhea. Her first attack was in July, 1910, and was more or less continuous until admission. A striking feature of the case was the continuous sore mouth. She left the hospital against advice December 2, 1913.

(a) Furnished 300 c. c. sputum in November, 1913, for feeding rhesus 23.

Cases 29 to 51 were colored females in the State Insane Asylum at Milledgeville, Ga. Each furnished spinal fluid for spinal injection of monkeys and for the psychiatric studies of Dr. W. F. Lorenz, by whom all the tapplings and spinal inoculations were made.

Case 29.—M. I. admitted with pellagra March 21, 1914. Died of same April 17, 1914.

(a) Furnished spinal fluid (6 c. c.) April 14, 1914, for spinal injection of rhesus 98.

Case 30.—E. D. admitted November 2, 1913. On April 13, 1914, she had pellagra and died of same May 3, 1914.

(a) Furnished spinal fluid (4 c. c.) May 2, 1914, for spinal injection of rhesus 98.

Case 31.—E. H. showed red tongue, diarrhea, and eruption on hands and feet April 13, 1914.

(a) Furnished spinal fluid (6 c. c.) April 14, 1914, for spinal injection of rhesus 99.

Case 32.—B. A. admitted August 19, 1913; had pellagra April 14, 1914, and died of same June 22, 1914.

(a) Furnished spinal fluid (5 c. c.) May 2, 1914, for spinal injection of rhesus 99.

Case 33.—J. C. admitted September 23, 1913. Developed pellagra about March 20, 1914, and died of same May 20, 1914.

(a) Furnished spinal fluid (4 c. c.) May 7, 1914, for spinal injection of rhesus 99.

Case 34.—R. B. On May 13, 1914, she had sore mouth, diarrhea, vaginitis, and extensive moist eruption over hands and feet. On August 8, 1914, the mouth was normal, the diarrhea had ceased, and the eruption had disappeared.

(a) Furnished spinal fluid (7 c. c.) May 19, 1914, for spinal injection of rhesus 99 and 6 c. c. for 109.

Case 35.—M. B. On May 20, 1914, she had a red tongue, diarrhea, and eruption around eyes.

(a) Furnished spinal fluid (5 c. c.) May 30, 1914, for spinal injection of rhesus 99 and 5 c. c. for rhesus 109.

Case 36.—W. B. admitted April 15, 1914, with pellagra and died of same May 3, 1914.

(a) Furnished spinal fluid (6 c. c.) April 20, 1914, for spinal injection of rhesus 100.

Case 37.—E. B. On January 1, 1914, she had red tongue, diarrhea, and moist eruption on hands and feet. She had a previous attack in November, 1911. She died June 26, 1914.

(a) Furnished spinal fluid (4 c. c.) May 2, 1914, for spinal injection of rhesus 100.

Case 38.—K. H. On May 20, 1914, she had red tongue, diarrhea, and moist eruption on backs of hands and feet. On August 18, 1914, the diarrhea had stopped, the tongue was normal, and the feet were well.

(a) Furnished spinal fluid (6 c. c.) May 19, 1914, for spinal injection of rhesus 100 and 5 c. c. for 101.

Case 39.—L. W., admitted May 5, 1914, with pellagra and died of same June 19, 1914.

(a) Furnished spinal fluid (5 c. c.) May 30, 1914, for spinal injection of rhesus 100 and 5 c. c. for 107.

Case 40.—B. G., admitted March 2, 1914, with pellagra and died of same April 24, 1914.

(a) Furnished spinal fluid (8 c. c.) April 17, 1914, for spinal injection of rhesus 101.

Case 41.—J. W. On May 9, 1914, she had a very red tongue, diarrhea, and eruption on backs of hands. On August 8, 1914, all symptoms had practically disappeared.

(a) Furnished spinal fluid (5 c. c.) May 19, 1914, for spinal injection of rhesus 107 and 5 c. c. for 108.

Case 42.—M. A. On May 21, 1914, she had an eruption on the hands and around the eyes. She had a previous attack May 27, 1913.

(a) Furnished spinal fluid (5 c. c.) May 30, 1914, for spinal injection of rhesus 108 and 5 c. c. for 109. Furnished spinal fluid (5 c. c.) July 10, 1914, for spinal injection of rhesus 105.

Case 43.—M. P. On May 7, 1914, she had sore mouth, diarrhea, and eruption on hands and feet.

(a) Furnished spinal fluid (9 c. c.) June 12, 1914, for spinal injection of rhesus 102.

Case 44.—E. R. On July 25, 1914, she had sore mouth, diarrhea, and eruption on hands and feet.

(a) Furnished spinal fluid (5 c. c.) July 10, 1914, for spinal injection of rhesus 102 and 5 c. c. for 104.

Case 45.—C. McM. On May 3, 1914, she had sore mouth, diarrhea, and eruption on hands, wrists, and feet.

(a) Furnished spinal fluid (8 c. c.) June 12, 1914, for spinal injection of rhesus 103.

Case 46.—C. H. On July 24, 1914, she had sore mouth and eruption on hands, forearm, and feet.

(a) Furnished spinal fluid (5 c. c.) July 10, 1914, for spinal injection of rhesus 103.

Case 47.—E. V. On May 13, 1914, had sore mouth, diarrhea, and eruption.

(a) Furnished spinal fluid (8 c. c.) June 12, 1914, for spinal injection of rhesus 104.

Case 48.—J. B. On May 8, 1914, she had sore mouth, diarrhea, and eruption on hands and feet.

(a) Furnished spinal fluid (6 c. c.) June 12, 1914, for spinal injection of rhesus 105.

Case 49.—K. McD. On May 3, 1914, she had sore mouth, diarrhea, and eruption on hands, forearms, feet, and legs.

(a) Furnished spinal fluid (7 c. c.) June 12, 1914, for spinal injection of rhesus 106.

Case 50.—K. A. C. On July 27, 1914, she had sore mouth and eruption on hands and feet.

(a) Furnished spinal fluid (5 c. c.) July 10, 1914, for spinal injection of rhesus 106.

Case 51.—R. P. On March 13, 1914, she had sore mouth, diarrhea, and eruption on hands and feet.

(a) Furnished spinal fluid (8 c. c.) June 12, 1914, for spinal injection of rhesus 110.

Case 52.—W. H. B., white male, age 53, admitted to the Marine Hospital April 22, 1914, with erythema on backs of hands and fronts of wrists, sore mouth, and diarrhea. The present attack began in March, 1914. His first attack was in January, 1913. Patient was discharged May 22, 1914.

(a) Furnished spinal fluid May 13, 1914, for spinal injection (5 c. c. each) of rhesus 19, 28, and 58.

Case 53.—B. B., white, male, age 21, admitted to the Marine Hospital November 11, 1913, with eruption on hands, face, and neck, and with sore mouth, and diarrhea. The present attack began in September, 1913. His first attack was in October, 1912. Patient was discharged December 17, 1913. He was readmitted April 1, 1914, with erythema on the face and hands. On May 7, 1914, he became noisy and violent, and had to be restrained. He was discharged on his own request May 16, 1914. It was later learned that he had died.

(a) Furnished spinal fluid May 13, 1914, for spinal injection (5 c. c. each) of rhesus 26, 27, 80, and 84.

Case 54.—J. W., white, male, age 56, was admitted to the Marine Hospital April 25, 1914, with erythema of hands and wrists, sore mouth, and diarrhea. The present attack was his first and began in April, 1914. He was discharged September 9, 1914.

(a) Furnished spinal fluid May 13, 1914, for spinal injection (5 c. c. each) of rhesus 71, 73, 81, and 82.

II. AUTOPSY NOTES.

Autopsy No. 1.—M. W., died at Savannah, Ga., July 29, 1913, at autopsy July 29 at 6 p. m., injection of animals was begun July 30 at

autopsy there was a desquamation or peeling of the dorsum of both hands and feet and of both elbows and knees. The skin lesions also involved the back of neck, the vulva, and buttocks. There was seborrhea of the face and redness of the tongue. This was a marked case of the "wet type" of the disease.

Patient was a colored female, 35 years of age, married, and had two children. Her first attack of pellagra occurred in April, 1913.

For disposal of autopsy material see following headings:

(a) Injection of brain, spinal cord, and their membranes.

Gauze filtrate; cerebrally, venously, and subcutaneously into rhesus 51 and 52.

(b) Injection of intestines and contents.

Berkefeld filtrate; cerebrally, venously, and subcutaneously into rhesus 53.

(c) Injection of skin.

Gauze filtrate; cerebrally, venously, and subcutaneously into rhesus 54.

Autopsy No. 2.—S. S., died at the State Insane asylum, Columbia, S. C., August 17, 1913, at 8 p. m., autopsy August 17 at 9 p. m., injection of animals was begun August 18 at 6 p. m. The only skin lesion at death was a thickening and pigmentation of a triangular area on the flexor surface of each wrist and on the elbows. The patient was an insane colored female, age 35.

For disposal of autopsy material see following headings:

(a) Injection of brain, spinal cord, and their membranes.

Gauze filtrate; cerebrally and venously into rhesus 57.

(b) Injection of intestines and contents.

Gauze filtrate; venously into Java 63.

Berkefeld filtrate; cerebrally and venously into baboon 64. Venously into baboon 66.

(c) Injection of skin.

Gauze filtrate; cerebrally and venously into Java 59.

Berkefeld filtrate; cerebrally, venously, and subcutaneously into rhesus 61 and 62.

(d) Injection of cerebrospinal fluid collected at autopsy. Not filtered; cerebrally and venously into rhesus 58.

Autopsy No. 3.—R. H. died at the Georgia Infirmary October 12, 1913, at 3 a. m.; autopsy October 12 at 3 p. m.; injection of animals was begun October 13 at 5 p. m. The body showed marked skin lesions involving the forearms, dorsum of hands, sacral region, and vulva.

The patient was a mulatto female, 14 years of age, single. Her first attack of the disease was in February, 1913. She was admitted to the Georgia Infirmary October 5, 1913.

For disposal of autopsy material see following headings:

(a) Injection of brain, spinal cord, and their membranes.

Gauze filtrate; venously into rhesus 19.

(b) Injection of intestines and contents.

Gauze filtrate; venously into rhesus 21.

(c) Injection of skin.

Gauze filtrate; venously into rhesus 17 and 18.

(d, Table No. 11) Feeding of stomach and contents, large intestine and contents, small intestines and contents, pancreas, spleen, mesentery and mesenteric glands to rhesus monkeys 1, 2, 3, 4, 5, 6, 8, and baboon 66.

Autopsy No. 4.—D. S. died at the Savannah Hospital October 28, 1913, at 3 a. m.; autopsy October 28, at 11 a. m. The injection of animals with cerebrospinal fluid was done October 28 at 6 p. m. The injections of tissues were begun October 29.

The patient was a white female, 33 years of age, married. Her first attack was in September, 1913. On admission to the hospital, three days before

death, the patient had a very sore mouth, erythema on hands, elbows, forearms, about vulva and anus, and had a diarrhea. This was regarded as a case of typhoid pellagra.

For disposal of autopsy material see following headings:

(a) Injection of brain, spinal cord, and their membranes.

Gauze filtrate; spinally into rhesus 41; venously into rhesus 49.

(b) Injection of intestines and contents.

Gauze filtrate; venously into rhesus 25, 45, and 47.

(c) Injection of skin.

Gauze filtrate; venously and subcutaneously into rhesus 38, 39, and 40.

(d) Injection of cerebrospinal fluid collected at autopsy. Not filtered; spinally into rhesus 26, 27, 28, and 58.

(e, Table No. 11) Feeding of stomach and contents, large intestine and contents, small intestines and contents, pancreas, spleen, portion of liver, one kidney, mesentery and mesenteric glands to rhesus monkeys 1, 2, 3, 4, 5, 6, 8, 29, 31, 32, 33, 34, 35, 36, 37, and baboons 65 and 66.

Autopsy No. 5.—J. W. died at the Marine Hospital December 27, 1913, at 2 p. m.; autopsy nine hours after death.

Patient was a white male, age 43. Previous attacks were in 1910 and 1912; present attack began in August, 1913. He was admitted to the hospital November 1, 1913, with scaly eruption on both hands and elbows, sore mouth, and uncontrollable diarrhea. At times during his last three weeks he exhibited mental depression and excitement.

For disposal of autopsy material, see Table No. 11. Feeding between December 29 and January 3 of stomach and contents, large intestines and contents, and small intestines and contents to rhesus monkeys 1, 2, 3, 4, 5, 6, 8, and baboon 65.

Autopsy No. 6.—T. A. died at the Georgia Infirmary January 20, 1914, at 12.30 a. m.; autopsy, January 20, at 2 p. m. The injection of animals with pericardial fluid and cerebrospinal fluid was done January 20; injections with tissues were started January 21. The body showed skin lesions which involved the back of right hand and one elbow.

Patient was a colored male, age 25, married; admitted to hospital November 15, 1913, for diarrhea, which persisted until death. Marked skin lesions involving the back of right hand and elbow appeared December 25, 1913.

For disposal of autopsy material see following headings:

(a) Brain, spinal cord, and their membranes.

Berkefeld filtrate; spinally into rhesus 84.

(b) Injection of intestines and contents.

Gauze filtrate; venously into rhesus 85 and 86.

(c) Injection of skin.

Gauze filtrate; venously into rhesus 87.

(d) Injection of cerebrospinal fluid collected at autopsy. Not filtered; spinally into rhesus 80.

(e) Injection of pericardial fluid.

Not filtered; venously (10 c. c. daily for five days) into each of rhesus 81 and 82.

Berkefeld filtrate; spinally into rhesus 71 and 73.

(f, Table No. 11.) Feeding between January 21 and 29, 1914, of entire contents of buccal, thoracic, and abdominal cavities into rhesus monkeys 1, 2, 3, 4, 5, 6, 8, 31, 32, 33, 34, 35, 36, 37, and baboons 65 and 66.

Autopsy No. 7.—M. S. died at the Savannah Hospital February 4, 1914, at 9 a. m.; autopsy February 4 at noon; injection of animals was begun February 4 at 5 p. m. The body showed an erythema of the neck, forearms, elbows, and dorsal surfaces of the feet.

Patient was a white female, age 30, single. She had had an attack of pellagra each year since 1906. The present attack began in April, 1913, and was characterized, on admission to hospital in December, 1913, by an eruption on the face, hands, arms, neck, and feet and by sore mouth and diarrhea.

For disposal of autopsy material see following headings:

(a) Injection of intestines and contents.

Gauze filtrate; venously into rhesus 91.

(b) Injection of cerebrospinal fluid collected at autopsy.

Berkefeld filtrate; spinally into rhesus 26, 27, 28, and 58.

(c, Table No. 11.) Feeding on February 5 of brain, spinal cord, and their membranes to rhesus monkeys 1, 2, 3, 4, 5, 6, 8, 32, 33, 34, 36, 37, 95, 96, and baboon 64; feeding on February 6 of entire contents of buccal and thoracic cavities to the same monkeys; feeding on February 7 and 9 of entire contents of abdominal cavity, except stomach, intestines, and their contents, to the same monkeys; feeding on February 10 of stomach, large and small intestines without their contents to the same monkeys.

(d) Feces collected from large and small intestines and mixed with spoiled corn meal were fed daily from February 5 to February 11 to rhesus monkeys 93 and 94.

Autopsy No. 8.—C. R. died at the Marine Hospital April 11, 1914, at 2 a. m.; autopsy April 11 at 10 a. m.; injection of animals with tissues was begun April 11 at 6 p. m. The body showed marked wet lesions of both hands and wrists, sore mouth, and diarrhea.

Patient was a white male, age 51; admitted to Marine Hospital March 7, 1914. His first attack began in February, 1914, and was continuous until death. It was manifested by red tongue, sore mouth, diarrhea, eruption on hands, wrists, nose, and face, and burning sensations of feet.

For disposal of autopsy material see following headings:

(a) Injection of brain, spinal cord, and their membranes.

Gauze filtrate; spinally into rhesus 1, 2, 3, 5, 6, 25, 38, 45, 49, 61, and 62.

Berkefeld filtrate; spinally into rhesus 26, 38, and 39.

(b) Injection of buccal, thoracic, and abdominal organs, except intestines.

Gauze filtrate; venously and subcutaneously into rhesus 32, 33, 34, 41, 45, 47, and 49.

Berkefeld filtrate; venously into rhesus 27, 28, and 58.

(c) Injection of intestines and contents.

Berkefeld filtrate; venously and subcutaneously into rhesus 1, 2, 3, 5, 6, 36, 37, 39, 40, and 62.

(d) Injection of cerebrospinal fluid collected at autopsy.

Berkefeld filtrate; spinally into rhesus 32, 33, 34, 35, 36, and 37.

(e, Table No. 11.) Feeding on April 13 of the brain, spinal cord, and their membranes to rhesus monkeys 11, 13, 17, 18, 19, 26, 27, 28, 32, 33, 34, 35, 36, 37, 53, 58, 95, 96, and baboon 65.

(f) Feeding on April 14, 15, 16, and 17 of the entire contents of the buccal, thoracic, and abdominal cavities mixed with spoiled corn meal to rhesus monkeys 11, 13, 17, 18, 19, 26, 27, 28, 32, 33, 34, 35, 36, 37, 53, 58, 95, 96, and baboon 65.

Autopsy No. 9.—P. T. died at the Georgia Infirmary May 27, 1914, at 6 a. m.; autopsy May 27 at 11 a. m.; animals injected May 27 at 5 p. m. At autopsy the epidermis was absent or loose in a bleblike condition on both hands, both wrists, both elbows, and both feet. The tongue was red at the margin and the soft palate and pharynx were red and ulcerated. The body was well nourished. This was a marked "wet case."

Patient was a colored female, age 30. Her first attack was in April, 1913. Present attack began in February, 1914, and was manifested, on admission May 9, by erythema of hands and neck, and diarrhea.

For disposal of autopsy material see following headings:

(a) Injection of brain, spinal cord, and their membranes.

Gauze filtrate; spinally and peritoneally into rhesus 114, 115, 116, and 121.

Cerebrally and muscularly into rhesus 119.

Cerebrally and peritoneally into rhesus 120.

Autopsy No. 10.—M. P. died at the Georgia Infirmary June 3, 1914, at 1 a. m.; autopsy June 3 at 10 a. m.; animals injected June 3 at 3 p. m. At autopsy the epidermis was absent or exfoliating in large pieces, leaving reddened moist dermis in the following locations: Back of all fingers, backs and front of both wrists, backs of both forearms halfway to elbows, backs of both elbows, between nates, and about vulva. There had been marked lesions on all eyelids and about the chin. Mouth was in a very bad condition. The body was well nourished.

Patient was a colored female, age 35. Her first attack was in May, 1913. Present attack began in May, 1914. Admitted to Georgia Infirmary May 18, 1914.

For disposal of autopsy material see following headings.

(a) Injection of brain, spinal cord, and their membranes.

Gauze filtrate; cerebrally and peritoneally into rhesus 123. Cerebrally and muscularly into rhesus 117.

APPENDIX II.

SUMMARY OF INDIVIDUAL EXPERIMENTS MADE UPON EACH MONKEY.

Rhesus No. 1.

- 1913. October 14 to 28, fed with tissues from autopsy No. 3.
October 29 to November 6, fed with tissues from autopsy No. 4.
December 29 to January 3, fed with tissues from autopsy No. 5.
- 1914. January 21 to 29, fed with tissues from autopsy No. 6.
February 5 to 10, fed with tissues from autopsy No. 7.
- 1915. June 17 to 23, intraperitoneally (90 c. c.) Berkefeld filtrate of feces.

Rhesus No. 2.

- 1913. October 14 to 28, fed with tissues from autopsy No. 3.
October 29 to November 6, fed with tissues from autopsy No. 4.
December 29 to January 3, fed with tissues from autopsy No. 5.
- 1914. January 21 to 29, fed with tissues from autopsy No. 6.
February 5 to 10, fed with tissues from autopsy No. 7.
- 1915. June 17 to 20, intraperitoneally (60 c. c.) Berkefeld filtrate of feces.
Died June 24, 1915; few adhesions between loops of intestines.

Rhesus No. 3.

- 1913. October 14 to 28, fed with tissues from autopsy No. 3.
October 29 to November 6, fed with tissues from autopsy No. 4.
December 29 to January 3, fed with tissues from autopsy No. 5.
- 1914. January 21 to 28, fed with tissues from autopsy No. 6.
February 5 to 10, fed with tissues from autopsy No. 7.
- 1915. June 17 to 23, intraperitoneally (110 c. c.) Berkefeld filtrate of feces.

Rhesus No. 4.

- 1913. October 14 to 28, fed with tissues from autopsy No. 3.
October 29 to November 6, fed with tissues from autopsy No. 4.
December 29 to January 3, fed with tissues from autopsy No. 5.
- 1914. January 21 to 28, fed with tissues from autopsy No. 6.
February 5 to 10, fed with tissues from autopsy No. 7.
- Died April 15, 1914; marked congestion of brain and spinal cord.

Rhesus No. 5.

- 1913. October 14 to 28, fed with tissues from autopsy No. 3.
October 29 to November 6, fed with tissues from autopsy No. 4.
December 29 to January 3, fed with tissues from autopsy No. 5.
- 1914. January 21 to 28, fed with tissues from autopsy No. 6.
February 5 to 10, fed with tissues from autopsy No. 7.

Rhesus No. 6.

1913. October 14 to 28, fed with tissues from autopsy No. 3.
October 29 to November 6, fed with tissues from autopsy No. 4.
December 29 to January 3, fed with tissues from autopsy No. 5.
1914. January 21 to 29, fed with tissues from autopsy No. 6.
February 5 to 10, fed with tissues from autopsy No. 7.

Rhesus No. 8.

1913. October 14 to 28, fed with tissues from autopsy No. 3.
October 29 to November 6, fed with tissues from autopsy No. 4.
December 29 to January 3, fed with tissues from autopsy No. 5.
1914. January 21 to 29, fed with tissues from autopsy No. 6.
February 5 to 10, fed with tissues from autopsy No. 7.
September 18, intranasal application of feces.
Died February 23, 1915; tuberculosis.

Rhesus No. 9.

1913. November 9 to 25, fed with sputum (700 c. c.).
1914. February and March, fed with sputum (2,970 c. c.).
September 18, intranasal application of feces.
1915. June 17 to 23, intraperitoneally (90 c. c.) Berkefeld filtrate of feces.
Died June 28, 1915; injection of esophagus, stomach, intestines, and kidneys.
Gall bladder large and distended.

Rhesus No. 10.

1913. November 29 to December 8, intravenously (130 c. c.) urine.
1914. April 8 to 13, intravenously (85 c. c.) urine.
June 6, intramuscularly (10 c. c.) blood.
1915. June 17 and 18, intraperitoneally (30 c. c.) Berkefeld filtrate of feces.
Died June 19, 1915; omentum injected.

Rhesus No. 11.

1915. June 17 to 20, intraperitoneally (50 c. c.) Berkefeld filtrate of feces.
Died July 2, 1915; four superficial small abscesses of liver.

Rhesus No. 13.

1915. June 17 to 23, intraperitoneally (110 c. c.) Berkefeld filtrate of feces.

Rhesus No. 14.

1913. November 9 to 25, fed with sputum (650 c. c.).
1914. March 7 to 31, fed with sputum (1,000 c. c.).
September 18, intranasal application of feces.
1915. June 17 to 23, intraperitoneally (90 c. c.) Berkefeld filtrate of feces.
Died June 23, 1915; injection and adhesions of all abdominal organs.

Rhesus No. 16.

1913. November 13 to 26, fed with sputum (910 c. c.).
December 2 to 8, fed with sputum (190 c. c.).
1914. March 17 to 31, fed with sputum (1,100 c. c.).

Rhesus No. 17.

1913. October 13, intravenously (1 c. c.) gauze filtrate of skin, autopsy No. 3.
 1915. June 17 to 23, intraperitoneally (120 c. c.) Berkefeld filtrate of feces.
 Died October 26, 1915; cause of death not apparent at autopsy.

Rhesus No. 18.

1913. October 13 to 17, intravenously (1 c. c. daily) gauze filtrate of skin, autopsy No. 3.

Rhesus No. 19.

1913. October 13 to 16, intravenously ($\frac{1}{2}$ c. c. daily) gauze filtrate of brain and spinal cord, autopsy No. 3.
 1914. May 13, intraspinaly (5 c. c.) spinal fluid from patient W. H. B.

Rhesus No. 21.

1913. October 13, intravenously (1 c. c.) gauze filtrate intestines and contents, autopsy No. 3.
 Died March 16, 1914; tuberculosis.

Rhesus No. 23.

1913. November 13 to 25, fed with sputum (700 c. c.).
 December 2 to 8, fed with sputum (100 c. c.).
 1914. March 17 to 31, fed with sputum (780 c. c.).

Rhesus No. 24.

1915. June 20 to 23, intraperitoneally (80 c. c.) Berkefeld filtrate feces.
 Died July 21, 1915; tuberculosis.

Rhesus No. 25.

1913. November 4 and 8, intravenously (1 c. c. each time) gauze filtrate intestines and contents autopsy No. 4.
 Died February 18, 1915; tuberculosis.

Rhesus No. 26.

1913. October 28, intraspinaly (1 c. c.) cerebrospinal fluid autopsy No. 4.
 1914. February 4, intraspinaly (4 c. c.) cerebrospinal fluid autopsy No. 7.
 May 13, intraspinaly (5 c. c.) spinal fluid patient B. B.
 June 2, intraspinaly (9 c. c.) spinal fluid patient W. T. D.

Rhesus No. 27.

1913. October 28, intraspinaly (2 c. c.) cerebrospinal fluid autopsy No. 4.
 1914. February 4, intraspinaly (5 c. c.) cerebrospinal fluid autopsy No. 7.
 May 13, intraspinaly (5 c. c.) spinal fluid patient B. B.
 June 2, intraspinaly (9 c. c.) spinal fluid patient W. T. D.

Rhesus No. 28.

1913. October 28, intraspinaly (3 c. c.) cerebrospinal fluid from autopsy No. 4.
 1914. February 4, intraspinaly (5 c. c.) cerebrospinal fluid from autopsy No. 7.
 May 15, intraspinaly (5 c. c.) spinal fluid from patient W. H. B.
 September 19, intranasal application of feces.

Rhesus No. 29.

1913. October 29 to November 6, fed with tissues from autopsy No. 4.
Died November 26, 1913; autopsy failed to reveal cause of death.

Rhesus No. 31.

1913. October 29 to November 3, fed with tissues from autopsy No. 4.
1914. January 21 to 29, fed with tissues from autopsy No. 6.
Died February 2, 1914; autopsy failed to reveal cause of death.

Rhesus No. 32.

1913. October 29 to November 3, fed with tissues from autopsy No. 4.
1914. January 21 to 29, fed with tissues from autopsy No. 6.
February 5 to 10, fed with tissues from autopsy No. 7.
April 11, intraspinal injection (5 c. c.) cerebrospinal fluid autopsy No. 8.
Died June 22, 1915; tuberculosis.

Rhesus No. 33.

1913. October 29 to November 3, fed with tissues from autopsy No. 4.
1914. January 21 to 29, fed with tissues from autopsy No. 6.
February 5 to 10, fed with tissues from autopsy No. 7.
April 11, intraspinal (5 c. c.) cerebrospinal fluid from autopsy No. 8.
Died March 7, 1915; tuberculosis.

Rhesus No. 34.

1913. October 29 to 31, fed with tissues from autopsy No. 4.
1914. January 21 to 29, fed with tissues from autopsy No. 6.
February 5 to 10, fed with tissues from autopsy No. 7.
April 11, intraspinal (5 c. c.) cerebrospinal fluid from autopsy No. 8.

Rhesus No. 35.

1913. October 29 to November 1, fed with tissues from autopsy No. 4.
1914. January 21 to 29, fed with tissues from autopsy No. 6.
February 5 to 10, fed with tissues from autopsy No. 7.
April 11, intraspinal (5 c. c.) cerebrospinal fluid from autopsy No. 8.

Rhesus No. 36.

1913. October 29 to November 3, fed with tissues from autopsy No. 4.
1914. January 21 to 29, fed with tissues from autopsy No. 6.
February 5 to 10, fed with tissues from autopsy No. 7.
April 11, intraspinal (5 c. c.) cerebrospinal fluid from autopsy No. 8.

Rhesus No. 37.

1913. October 29 to November 4, fed with tissues from autopsy No. 4.
1914. January 21 to 29, fed with tissues from autopsy No. 6.
February 5 to 10, fed with tissues from autopsy No. 7.
April 11, intraspinal (5 c. c.) cerebrospinal fluid from autopsy No. 8.
1915. June 21 to 23, intraperitoneally (60 c. c.) Berkefeld filtrate of feces.

Rhesus No. 38.

1913. October 29, intravenously (2 c. c.), subcutaneously (1 c. c.) gauze filtrate skin autopsy No. 4.

1914. September 18, intranasal application feces.

Died February 19, 1915; tuberculosis.

Rhesus No. 39.

1913. October 29, intravenously (2 c. c.), subcutaneously (1 c. c.) gauze filtrate skin autopsy No. 4.

Died July 31, 1915; cause of death not apparent at autopsy.

Rhesus No. 40.

1913. October 29, intravenously (2 c. c.), subcutaneously (1 c. c.) gauze filtrate skin autopsy No. 4.

Rhesus No. 41.

1913. October 29, intraspinally (1 c. c.) gauze filtrate nervous tissue autopsy No. 4.

Rhesus No. 43.

1913. October 29, intraspinally (1.3 c. c.) gauze filtrate nervous tissue autopsy No. 4.

Died January 14, 1914; tuberculosis.

Rhesus No. 45.

1913. October 29, intravenously (2 c. c.) gauze filtrate intestines and contents autopsy No. 4.

Rhesus No. 47.

1913. October 29, intravenously (2 c. c.) gauze filtrate intestines and contents autopsy No. 4.

Rhesus No. 49.

1913. October 30, intravenously (2 c. c.) gauze filtrate brain cord and membranes autopsy No. 4.

Rhesus No. 50.

1913. October 30, intravenously (1 c. c.) gauze filtrate brain cord and membranes autopsy No. 4.

Died January 21, 1914; tuberculosis.

Rhesus No. 51.

1913. July 30, intracerebrally (1 c. c.), intravenously (3 c. c.), subcutaneously (4 c. c.), gauze filtrate brain cord and membranes autopsy No. 1.

Died June 12, 1914; tuberculosis.

Rhesus No. 52.

1913. July 30, intracerebrally (1 c. c.), intravenously (5 c. c.), subcutaneously (4 c. c.), gauze filtrate brain cord and membranes autopsy No. 1.

Died August 31, 1913; cerebral abscess.

Rhesus No. 53.

1913. July 30, intracerebrally (1 c. c.), intravenously (12 c. c.), subcutaneously (3 c. c.), Berkefeld filtrate intestines and contents autopsy No. 1.

Rhesus No. 54.

1913. July 30, intracerebrally (1 c. c.), intravenously (5 c. c.), subcutaneously (3 c. c.), gauze filtrate skin autopsy No. 1.

Died February 11, 1914; tuberculosis.

Rhesus No. 57.

1913. August 18, intracerebrally (1 c. c.), intravenously (5 c. c.), gauze filtrate brain cord and membrane autopsy No. 2.

Died October 27, 1913; cerebral abscess.

Rhesus No. 58.

1913. August 18, intracerebrally (1 c. c.), intravenously (5 c. c.), cerebrospinal fluid autopsy No. 2.

October 28, intraspinally (4.5 c. c.) cerebrospinal fluid autopsy No. 4.

1914. February 4, intraspinally (4 c. c.) Berkefeld filtrate cerebrospinal fluid autopsy No. 7.

May 13, intraspinally (5 c. c.) cerebrospinal fluid patient W. H. B.

1915. June 17 to 23, intraperitoneally (90 c. c.) Berkefeld filtrate of feces.

Died July 8, 1915; abscess in abdominal wall.

Java No. 59.

1913. August 18, intracerebrally (1 c. c.), intravenously (4 c. c.), gauze filtrate skin autopsy No. 2.

Died October 9, 1913, from oesophogostomum.

Rhesus No. 61.

1913. August 18, intracerebrally (1 c. c.), intravenously (9 c. c.), subcutaneously (4 c. c.), Berkefeld filtrate skin autopsy No. 2.

Rhesus No. 62.

1913. August 18, intracerebrally (1 c. c.), intravenously (10 c. c.), subcutaneously (6 c. c.), Berkefeld filtrate skin autopsy No. 2.

Baboon No. 64.

1913. August 18, intracerebrally (1 c. c.), intravenously (7 c. c.), Berkefeld filtrate intestines and contents autopsy No. 2.

1914. February 5 to 10, fed with tissues from autopsy No. 7.

Baboon No. 65.

1913. October 29 to November 6, fed with tissues from autopsy No. 4.

December 29 to January 3, fed with tissues from autopsy No. 5.

1914. January 21 to 29, fed with tissues from autopsy No. 6.

April 13 to 17, fed with tissues from autopsy No. 8.

Died June 2, 1914; autopsy failed to reveal cause of death.

Baboon No. 66.

1913. August 18 to September 17, intravenously (15 c. c.) Berkefeld filtrate feces autopsy No. 2.
 October 14 to 22, fed with tissues from autopsy No. 3.
 October 29 to November 6, fed with tissues from autopsy No. 4.
1914. January 21 to 29, fed with tissues from autopsy No. 6.

Rhesus No. 68.

1913. August 25, intravenously (2 c. c.) blood.
 August 26, intravenously (8 c. c.) blood.
 September 29, intravenously (8½ c. c.) blood.
 Died January 8, 1914; tuberculosis.

Rhesus No. 71.

1914. January 23, intraspinally (5 c. c.) pericardial fluid autopsy No. 6.
 May 13, intraspinally (5 c. c.) spinal fluid patient J. W.
 June 2, intraspinally (9 c. c.) spinal fluid patient C. N. D.

Rhesus No. 72.

1913. November 26 to December 8, intravenously (155 c. c.) Berkefeld filtrate of urine.
1914. June 6, intramuscularly (10 c. c.) blood patient W. T. D.
 September 19, intranasal application feces.

Rhesus No. 73.

1914. January 23 and 26, intraspinally (5 c. c., 5 c. c.) pericardial fluid autopsy No. 6.
 May 13, intraspinally (5 c. c.) spinal fluid patient J. W.

Rhesus No. 76.

1913. November 26 to December 8, intravenously (155 c. c.) Berkefeld filtrate of urine.
1914. April 8 to 13, intravenously (115 c. c.) Berkefeld filtrate of urine.
 June 6, intramuscularly (10 c. c.) blood of patient W. T. D.
 September 18, intranasal application feces.
 Died July 26, 1915; tuberculosis.

Rhesus No. 77.

1913. November 14 to 26, fed with sputum (680 c. c.).
 December 2 to 8, fed with sputum (235 c. c.).
1915. June 20 to 22, intraperitoneally (60 c. c.) Berkefeld filtrate of feces.
 Died August 4, 1915; tuberculosis.

Rhesus No. 78.

1915. June 22 and 23, intraperitoneal injection (40 c. c.) Berkefeld filtrate feces.

Rhesus No. 80.

1914. January 14, intraspinally (4.5 c. c.) cerebrospinal fluid autopsy No. 6.
 May 13, intraspinally (5 c. c.) spinal fluid patient B. B.
 June 2, intraspinally (9 c. c.) spinal fluid patient W. T. D.

Rhesus No. 81.

1914. January 20 to 26, intravenously (10 c. c. daily) pericardial fluid autopsy No. 6.

May 13, intraspinally (5 c. c.) spinal fluid patient J. W.

June 2, intraspinally (9 c. c.) spinal fluid patient C. N. D.

September 18, intranasal application feces.

Rhesus No. 82.

1914. January 20 to 26, intravenously (10 c. c. daily) pericardial fluid autopsy No. 6.

May 13, intraspinally (5 c. c.) spinal fluid patient J. W.

June 2, intraspinally (9 c. c.) spinal fluid patient C. N. D.

September 18, intranasal application feces.

1915. June 17 to 21, intraperitoneally (90 c. c.) Berkefeld filtrate feces.

Died July 2, 1915; marked adhesions affecting intestines and omentum.

Rhesus No. 84.

1914. January 21 and 22, intraspinally (5 c. c. each day) Berkefeld filtrate brain cord and membranes autopsy No. 6.

May 13, intraspinally (5 c. c.) spinal fluid patient B. B.

Died May 1, 1915; tuberculosis.

Rhesus No. 85.

1914. January 21 to 22, intravenously (1 c. c., 2 c. c.) gauze filtrate intestines and contents autopsy No. 6.

May 20, intravenously (6 c. c.), intraperitoneally (6 c. c.) mixed blood.

June 6, intraspinally (5 c. c.), intramuscularly (10 c. c.) blood patient C. N. D.

Rhesus No. 86.

1914. January 21-22, intravenously (2 c. c., 3 c. c.) gauze filtrate intestines and contents autopsy No. 6.

May 20, intravenously (6 c. c.), intraperitoneally (6 c. c.) mixed blood.

June 6, intraspinally (5 c. c.), intramuscularly (10 c. c.) blood patient C. N. D.

Rhesus No. 87.

1914. January 21, intravenously (2 c. c.) gauze filtrate skin autopsy No. 6.

Rhesus No. 91.

1914. February 4, intravenously (1 c. c.) gauze filtrate intestines and contents autopsy No. 7.

1915. June 21 to 23, intraperitoneally (60 c. c.) Berkefeld filtrate feces.

Rhesus No. 93.

1914. February 5 to 11, fed feces and spoiled corn meal.

April 8 to 13, intravenously (90 c. c.) urine.

Died March 29, 1915; monkey birth.

Rhesus No. 94.

1914. February 5 to 11, fed feces and spoiled corn meal.

April 8 to 13, intravenously (105 c. c.) urine.

Rhesus No. 95.

1914. February 5 to 11, fed with tissues from autopsy No. 7.

Rhesus No. 96.

1914. February 5 to 10, fed with tissues from autopsy No. 7.

Rhesus No. 97.

1914. February 17 to 18, fed amebic stool of a nonpellagrin (150 c. c. and 100 c. c.)

1915. June 17 to 23, intraperitoneally (130 c. c.) Berkefeld filtrate feces.
Died October 5, 1915; tuberculosis.

Rhesus No. 98.

1914. April 14, intraspinally (6 c. c.) spinal fluid M. T.

May 2, intraspinally (4 c. c.) spinal fluid E. D.

September 18, intranasal application feces.

1915. June 18 to 22, intraperitoneally (100 c. c.) Berkefeld filtrate feces.

Rhesus No. 99.

1914. April 14, intraspinally (6 c. c.) spinal fluid E. H.

May 2, intraspinally (5 c. c.) spinal fluid B. A.

May 7, intraspinally (4 c. c.) spinal fluid I. C.

May 19, intraspinally (7 c. c.) spinal fluid R. B.

May 30, intraspinally (5 c. c.) spinal fluid M. B.

September 18, intranasal application feces.

1915. June 17 to 23, intraperitoneally (130 c. c.) Berkefeld filtrate feces.

Rhesus No. 100.

1914. April 20, intraspinally (6 c. c.) spinal fluid W. B.

May 2, intraspinally (4 c. c.) spinal fluid E. B.

May 19, intraspinally (6 c. c.) spinal fluid K. H.

May 30, intraspinally (5 c. c.) spinal fluid J. W.

September 18, intranasal application feces.

Died December 18, 1914; tuberculosis.

Rhesus No. 101.

1914. April 17, intraspinally (8 c. c.) spinal fluid B. G.

May 19, intraspinally (5 c. c.) spinal fluid K. H.

May 30, intraspinally (5 c. c.) spinal fluid M. B.

September 18, intranasal application feces.

1915. June 17 to 23, intraperitoneally (110 c. c.) Berkefeld filtrate feces.

Died June 27, 1915; adhesions between intestines and between intestines and omentum.

Rhesus No. 102.

1914. June 12, intraspinally (9 c. c.) spinal fluid M. P.

July 10, intraspinally (5 c. c.) spinal fluid E. R.

Rhesus No. 103.

1914. June 12, intraspinally (8 c. c.) spinal fluid C. McM.
July 10, intraspinally (5 c. c.) spinal fluid C. H.
September 18, intranasal application feces.

Rhesus No. 104.

1914. June 12, intraspinally (8 c. c.) spinal fluid E. V.
July 10, intraspinally (5 c. c.) spinal fluid E. R.
September 18, intranasal application feces.

Rhesus No. 105.

1914. June 12, intraspinally (6 c. c.) spinal fluid J. B.
July 10, intraspinally (5 c. c.) spinal fluid M. A.
September 18, intranasal application feces.
Died October 13, 1915, cause of death not apparent at autopsy.

Rhesus No. 106.

1914. June 12, intraspinally (7 c. c.) spinal fluid K. McD.
July 10, intraspinally (5 c. c.) spinal fluid K. A. C.
September 18, intranasal application feces.

Rhesus No. 107.

1914. May 19, intraspinally (5 c. c.) spinal fluid J. W.
May 30, intraspinally (5 c. c.) spinal fluid L. W.
September 18, intranasal application feces.

Rhesus No. 108.

1914. May 19, intraspinally (5 c. c.) spinal fluid J. W.
May 30, intraspinally (5 c. c.) spinal fluid M. A.
September 19, intranasal application feces.
1915. June 21-23, intraperitoneally (60 c. c.) Berkefeld filtrate feces.

Rhesus No. 109.

1914. May 19, intraspinally (6 c. c.) spinal fluid R. B.
May 30, intraspinally (5 c. c.) spinal fluid M. A.
September 19, intranasal application feces.
1915. June 20-23, intraperitoneally (60 c. c.) Berkefeld filtrate feces.

Rhesus No. 110.

1914. June 12, intraspinally (8 c. c.) spinal fluid R. P.
July 10, intraspinally (5 c. c.) spinal fluid C. H.
September 19, intranasal application feces.

Rhesus No. 111.

1915. June 17-23, intraperitoneally (130 c. c.) Berkefeld filtrate feces.
Died September 18, 1915, cause of death not apparent at autopsy.

Rhesus No. 114.

1914. May 27, intraspinally (2 c. c.), intraperitoneally (2 c. c.) gauze filtrate, brain, spinal cord, and membranes autopsy No. 9.
September 19, intranasal application feces.
Died July 8, 1915; tuberculosis.

Rhesus No. 115.

1914. May 27, intraspinally (2 c. c.), intraperitoneally (2 c. c.) gauze filtrate, brain, spinal cord, and membranes autopsy No. 9.
September 18, intranasal application feces.

Rhesus No. 116.

1914. May 27, intraspinally (2 c. c.), intraperitoneally (2 c. c.) gauze filtrate, brain, spinal cord, and membranes autopsy No. 9.
September 18, intranasal application feces.

Rhesus No. 117.

1914. June 3, intracerebrally (1 c. c.), intramuscularly (1 c. c.) gauze filtrate, brain, spinal fluid, and membranes autopsy No. 9.
1914. September 18, intranasal application feces.

Rhesus No. 119.

1914. May 27, intracerebrally (1 c. c.), intramuscularly (1 c. c.), gauze filtrate, brain, spinal cord, and membranes autopsy No. 9.
September 18, intranasal application feces.
1915. June 17-20, intraperitoneally (70 c. c.) Berkefeld filtrate feces.
Died June 24, 1915; peritoneum everywhere apparently normal. Bile colored mucous membrane, stomach, and duodenum.

Rhesus No. 120.

1914. May 27, intracerebrally (1 c. c.), intraperitoneally (1 c. c.), gauze filtrate, brain, spinal cord, and membranes autopsy No. 9.
September 18, intranasal application feces.
1915. June 17-23, intraperitoneally (110 c. c.) Berkefeld filtrate feces.
Died June 30, 1915; intestines matted together; liver and intestines adherent to abdominal wall.

Rhesus No. 121.

1914. May 27, intraspinally (2 c. c.), intraperitoneally (2 c. c.), gauze filtrate, brain, spinal cord, and membrane autopsy No. 9.
September 19, intranasal application feces.

Rhesus No. 123.

1914. June 3, intracerebrally (1 c. c.), intraperitoneally (1 c. c.), gauze filtrate, brain, spinal cord, and membranes autopsy No. 9.
September 18, intranasal application feces.

HYGIENIC LABORATORY BULLETINS OF THE PUBLIC HEALTH SERVICE.

The Hygienic Laboratory was established in New York, at the Marine Hospital on Staten Island, August, 1887. It was transferred to Washington, with quarters in the Butler Building, June 11, 1891, and a new laboratory building, located in Washington, was authorized by act of Congress March 3, 1901.

The following *bulletins* [Bulls. Nos. 1-7, 1900 to 1902, Hyg. Lab., U. S. Mar.-Hosp.-Serv., Wash.] have been issued:

*No. 1.—Preliminary note on the viability of the *bacillus pestis*. By M. J. Rosenau.

No. 2.—Formalin disinfection of baggage without apparatus. By M. J. Rosenau.

*No. 3.—Sulphur dioxide as a germicidal agent. By H. D. Geddings.

*No. 4.—Viability of the *Bacillus pestis*. By M. J. Rosenau.

No. 5.—An investigation of a pathogenic microbe (*B. typhi murium* Danysz) applied to the destruction of rats. By M. J. Rosenau.

*No. 6.—Disinfection against mosquitoes with formaldehyde and sulphur dioxide. By M. J. Rosenau.

†No. 7.—Laboratory technique: Ring test for indol, by S. B. Grubbs and Edward Francis; Collodium sacs, by S. B. Grubbs and Edward Francis; Microphotography with simple apparatus, by H. B. Parker.

By act of Congress approved July 1, 1902, the name of the "United States Marine-Hospital Service" was changed to the "Public Health and Marine-Hospital Service of the United States," and three new divisions were added to the Hygienic Laboratory.

Since the change of name of the service the bulletins of the Hygienic Laboratory have been continued in the same numerical order, as follows:

*No. 8.—Laboratory course in pathology and bacteriology. By M. J. Rosenau. (Revised edition, March, 1904.)

†No. 9.—Presence of tetanus in commercial gelatin. By John F. Anderson.

*No. 10.—Report upon the prevalence and geographic distribution of hookworm disease (uncinariasis or anchylostomiasis) in the United States. By Ch. Wardell Stiles.

*No. 11.—An experimental investigation of *Trypanosoma lewisi*. By Edward Francis.

*No. 12.—The bacteriological impurities of vaccine virus; an experimental study. By M. J. Rosenau.

*No. 13.—A statistical study of the intestinal parasites of 500 white male patients at the United States Government Hospital for the Insane; by Philip E. Garrison, Brayton H. Ransom, and Earle C. Stevenson. A parasitic roundworm (*Agamomeris culicis* n. g., n. sp.) in American mosquitoes (*Culex sollicitans*); by Ch. Wardell Stiles. The type species of the cestode genus *Hymenolepis*; by Ch. Wardell Stiles.

*No. 14.—Spotted fever (tick fever) of the Rocky Mountains; a new disease. By John F. Anderson.

*No. 15. Inefficiency of ferrous sulphate as an antiseptic and germicide. By Allen J. McLaughlin.

- *No. 16.—The antiseptic and germicidal properties of glycerin. By M. J. Rosenau.
- *No. 17.—Illustrated key to the trematode parasites of man. By Ch. Wardell Stiles.
- *No. 18.—An account of the tapeworms of the genus *Hymenolepis* parasitic in man, including reports of several new cases of the dwarf tapeworm (*H. mana*) in the United States. By Brayton H. Ransom.
- *No. 19.—A method for inoculating animals with precise amounts. By M. J. Rosenau.
- *No. 20.—A zoological investigation into the cause, transmission, and source of Rocky Mountain "spotted fever." By Ch. Wardell Stiles.
- *No. 21.—The immunity unit for standardizing diphtheria antitoxin (based on Ehrlich's normal serum). Official standard prepared under the act approved July 1, 1902. By M. J. Rosenau.
- *No. 22.—Chloride of zinc as a deodorant, antiseptic, and germicide. By T. B. McClintic.
- *No. 23.—Changes in the pharmacopœia of the United States of America, eighth decennial revision. By Reid Hunt and Murray Galt Motter.
- No. 24.—The international code of zoological nomenclature as applied to medicine. By Ch. Wardell Stiles.
- *No. 25.—Illustrated key to the cestode parasites of man. By Ch. Wardell Stiles.
- *No. 26.—On the stability of the oxidases and their conduct toward various reagents. The conduct of phenolphthalein in the animal organism. A test for saccharin, and a simple method of distinguishing between cumarin and vanillin. The toxicity of ozone and other oxidizing agents to lipase. The influence of chemical constitution on the lipolytic hydrolysis of ethereal salts. By J. H. Kastle.
- *No. 27.—The limitations of formaldehyde gas as a disinfectant with special reference to car sanitation. By Thomas B. McClintic.
- *No. 28.—A statistical study of the prevalence of intestinal worms in man. By Ch. Wardell Stiles and Philip E. Garrison.
- *No. 29.—A study of the cause of sudden death following the injection of horse serum. By M. J. Rosenau and John F. Anderson.
- †No. 30.—I. Maternal transmission of immunity to diphtheria toxine. II. Maternal transmission of immunity to diphtheria toxine and hypersusceptibility to horse serum in the same animal. By John F. Anderson.
- †No. 31.—Variations in the peroxidase activity of the blood in health and disease. By Joseph H. Kastle and Harold L. Amoss.
- †No. 32.—A stomach lesion in guinea pigs caused by diphtheria toxine and its bearing upon experimental gastric ulcer. By M. J. Rosenau and John F. Anderson.
- *No. 33.—Studies in experimental alcoholism. By Reid Hunt.
- †No. 34.—I. *Agamoflaria georgiana* n. sp. an apparently new roundworm, parasite from the ankle of a negress. II. The zoological characters of the roundworm genus *Flaria* Mueller, 1787. III. Three new American cases of infection of man with horsehair worms (species *Paragordius varius*), with summary of all cases reported to date. By Ch. Wardell Stiles.
- †No. 35.—Report on the origin and prevalence of typhoid fever in the District of Columbia. By M. J. Rosenau, L. L. Lumsden, and Joseph H. Kastle. (Including articles contributed by Ch. Wardell Stiles, Joseph Goldberger, and A. M. Stimson.)
- †No. 36.—Further studies upon hypersusceptibility and immunity. By M. J. Rosenau and John F. Anderson.

†No. 37.—Index-catalogue of medical and veterinary zoology. Subjects: Trematoda and trematode diseases. By Ch. Wardell Stiles and Albert Hassall.

No. 38.—The influence of antitoxin upon post-diphtheritic paralysis. By M. J. Rosenau and John F. Anderson.

†No. 39.—The antiseptic and germicidal properties of solutions of formaldehyde and their action upon toxines. By John F. Anderson.

†No. 40.—1. The occurrence of a proliferating cestode larva (*Sparganum proliferum*) in man in Florida, by Ch. Wardell Stiles. 2. A reexamination of the type specimen of *Filaria restiformis* Ledy, 1880=*Agramomermis restiformis*, by Ch. Wardell Stiles. 3. Observations on two new parasitic trematode worms: *Homalogaster philippinensis* n. sp., *Agamodistomum nanus* n. sp., by Ch. Wardell Stiles and Joseph Goldberger. 4. A reexamination of the original specimen of *Tania saginata abietina* (Weinland, 1858), by Ch. Wardell Stiles and Joseph Goldberger.

†No. 41.—Milk and its relation to the public health. By various authors.

†No. 42.—The thermal death points of pathogenic microorganisms in milk. By M. J. Rosenau.

†No. 43.—The standardization of tetanus antitoxin (an American unit established under authority of the act of July 1, 1902). By M. J. Rosenau and John F. Anderson.

No. 44.—Report No. 2 on the origin and prevalence of typhoid fever in the District of Columbia, 1907. By M. J. Rosenau, L. L. Lumsden, and Joseph H. Kastle.

†No. 45.—Further studies upon anaphylaxis. By M. J. Rosenau and John F. Anderson.

No. 46.—*Hepatozoon perniciosum* (n. g., n. sp.) ; a hæmogregarine pathogenic for white rats; with a description of the sexual cycle in the intermediate host, a mite (*Ielaps echidnimus*). By W. W. Miller.

No. 47.—Studies on thyroid: I. The relation of iodine to the physiological activity of thyroid preparations. By Reld Hunt and Atherton Seidell.

No. 48.—The physiological standardization of digitalis. By Charles Wallis Edmunds and Worth Hale.

No. 49.—Digest of comments on the United States pharmacopœia. Eighth decennial revision for the period ending December 31, 1905. By Murray Galt Motter and Martin I. Wilbert.

No. 50.—Further studies upon the phenomenon of anaphylaxis. By M. J. Rosenau and John F. Anderson.

No. 51.—Chemical tests for blood. By Joseph H. Kastle.

No. 52.—Report No. 3 on the origin and prevalence of typhoid fever in the District of Columbia (1908). By M. J. Rosenau, Leslie L. Lumsden, and Joseph H. Kastle.

No. 53.—The influence of certain drugs upon the toxicity of acetanilide and atipyrine. By Worth Hale.

No. 54.—The fixing power of alkaloids on volatile acids and its application to the estimation of alkaloids with the aid of phenolphthalein or by the Volhard method. By Elias Elvove.

No. 55.—Quantitative pharmacological studies; adrenalin and adrenalinlike bodies. By W. H. Schultz.

No. 56.—Milk and its relation to the public health. (Revised edition of Bulletin No. 41.) By various authors.

No. 57.—I. The presence of tubercle bacilli in the circulating blood in clinical and experimental tuberculosis. By John F. Anderson. II. The viability of the tubercle bacillus. By M. J. Rosenau.

No. 58.—Digest of comments on the pharmacopœia of the United States of America (eighth decennial revision) and the national formulary for the period ending December 31, 1906. By Murray Galt Motter and Martin I. Wilbert.

No. 59.—The oxidases and other oxygen catalysts concerned in biological oxidations. By Joseph Hoeling Kastle.

No. 60.—A study of the anatomy of *Watsonius* (n. g.), *Watsoni* of man, and of 19 allied species of mammalian trematode worms of the superfamily *Paramphistomoidea*. By Ch. Wardell Stiles and Charles Goldberger.

No. 61.—Quantitative pharmacological studies; Relative physiological activity of some commercial solutions of epinephrin. By W. H. Schultz.

No. 62.—The taxonomic value of the microscopic structure of the stigmal plates in the tick genus *Dermacentor*. By Ch. Wardell Stiles.

† No. 63.—Digest of comments on the pharmacopœia of the United States of America (eighth decennial revision) and on the national formulary (third edition) for the calendar year ending December 31, 1907. By Murray Galt Motter and Martin I. Wilbert.

No. 64.—Studies upon anaphylaxis with special reference to the antibodies concerned. By John F. Anderson and W. H. Frost.

No. 65.—Facts and problems of rabies. By A. M. Stimpson.

No. 66.—I. The influence of age and temperature on the potency of diphtheria antitoxin. By John F. Anderson. II. An organism (*Pseudomonas protea*) isolated from water, agglutinated by the serum of typhoid-fever patients. By W. H. Frost. III. Some considerations on colorimetry, and a new colorimeter. By Norman Roberts. IV. A gas generator in four forms, for laboratory and technical use. By Norman Roberts.

† No. 67.—The solubilities of the pharmacopœial organic acids and their salts. By Atherton Seldell.

No. 68.—The bleaching of flour and the effect of nitrites on certain medicinal substances. By Worth Hale.

No. 69.—The effects of restricted diet and of various diets upon the resistance of animals to certain poisons. By Reid Hunt.

No. 70.—A study of melting point determinations with special reference to the melting point requirements of the United States pharmacopœia. By George A. Menge.

No. 71.—1. Some known and three new endoparasitic trematodes from American fresh-water fish. By Joseph Goldberger. 2. On some new parasitic trematode worms of the genus *Telorchis*. By Joseph Goldberger. 3. A new species of *Athesmia* from a monkey. By Joseph Goldberger and Charles G. Crane.

† No. 72.—I. Report on an outbreak of typhoid fever at Omaha, Nebr. (1909-1910), by L. L. Lumsden. II. The water supply of Williamson, W. Va., and its relation to an epidemic of typhoid fever. By W. H. Frost.

No. 73.—The effect of a number of derivatives of choline and analogous compounds on the blood pressure. By Reid Hunt and R. de M. Taveau.

No. 74.—Digitalis standardization and the variability of crude and of medicinal preparations. By Worth Hale.

No. 75.—Digest of comments on the pharmacopœia of the United States of America (eighth decennial revision) and the national formulary (third edition) for the calendar year ending December 31, 1908. By Murray Galt Motter and Martin I. Wilbert.

No. 76.—The physiological standardization of ergot. By Charles Wallis Edmunds and Worth Hale.

No. 77.—Sewage pollution of interstate and international waters with special reference to the spread of typhoid fever. By Allan J. McLaughlin.

No. 78.—Report No. 4 on the origin and prevalence of typhoid fever in the District of Columbia (1909). By L. L. Lunsden and John F. Anderson. (Including articles contributed by Thomas B. McClintic and Wade H. Frost.)

No. 79.—Digest of comments on the pharmacopœia of the United States of America (eighth decennial revision) and the national formulary (third edition) for the calendar year ending December 31, 1909. By Murray Galt Motter and Martin I. Wilbert.

No. 80.—Physiological studies in anaphylaxis. Reaction of smooth muscle from various organs of different animals to proteins. (Including reaction of muscle from nonsensitized, sensitized, tolerant, and immunized guinea pigs.) By William H. Schultz.

No. 81.—Tissue proliferation in plasma medium. By John Sundwall.

No. 82.—I. Method of standardizing disinfectants with and without organic matter. By John F. Anderson and Thomas B. McClintic. II. The determination of the phenol coefficient of some commercial disinfectants. By Thomas B. McClintic.

No. 83.—I. Sewage pollution of interstate and international waters with special reference to the spread of typhoid fever. II. Lake Superior and St. Marys River. III. Lake Michigan and the Straits of Mackinac. IV. Lake Huron, St. Clair River, Lake St. Clair, and the Detroit River. V. Lake Ontario and St. Lawrence River. By Allan J. McLaughlin.

No. 84.—Digest of comments on the pharmacopœia of the United States of America (eighth decennial revision) and on the national formulary (third edition) for the calendar year ending December 31, 1910. By Murray Galt Motter and Martin I. Wilbert.

No. 85.—Index catalogue of medical and veterinary zoology. Subjects: Cestoda and cestodaria. By Ch. Wardell Stiles and Albert Hassall.

No. 86.—Studies on typhus. By John F. Anderson and Joseph Goldberger.

No. 87.—Digest of comments on the pharmacopœia of the United States of America (eighth decennial revision) and on the national formulary (third edition) for the calendar year ending December 31, 1911. By Murray Galt Motter and Martin I. Wilbert.

No. 88.—Method for determining the toxicity of coal-tar disinfectants, together with a report on the relative toxicity of some commercial disinfectants. By Worth Hale.

No. 89.—Sewage pollution of interstate and international waters with special reference to the spread of typhoid fever. VI. The Missouri River from Sioux City to its mouth. By Allan J. McLaughlin.

No. 90.—Epidemiologic studies of acute anterior poliomyelitis. I. Poliomyelitis in Iowa, 1910. II. Poliomyelitis in Cincinnati, Ohio, 1911. III. Poliomyelitis in Buffalo and Batavia, N. Y., 1912. By Wade H. Frost.

No. 91.—I. The cause of death from subdural injections of serum. By Worth Hale. II. Some new cholera selective media. By Joseph Goldberger.

No. 92.—Gaseous impurities in the air of railway tunnels. By Atherton Seidell and Phillip W. Meserve.

No. 93.—Digest of comments on the pharmacopœia of the United States of America (eighth decennial revision) and on the national formulary (third edition) for the calendar year ending December 31, 1912. By Murray Galt Motter and Martin I. Wilbert.

No. 94.—I. Collected studies on the insect transmission of *Trypanosoma evansi*. By M. Bruin Mitzmain. II. Summary of experiments in the transmission of anthrax by biting flies. By M. Bruin Mitzmain.

No. 95.—Laboratory studies on tetanus. By Edward Francis.

No. 96.—1. Report of investigation of coastal waters in the vicinity of Gulfport and Biloxi, Miss., with special reference to the pollution of shellfish. By R. H. Creel. 2. A comparison of methods for the determination of oxygen in waters in presence of nitrite. By Elias Elvove. 3. Some new compounds of the choline type; (III) including preparation of monoacetate of α , β dloxy- β -methyl butane. By G. A. Menge. 4. The detection of white phosphorus in matches. By Earle B. Phelps. 5. The chemical composition of rubber in nursing nipples and in some rubber toys. By Earle B. Phelps and Albert F. Stevenson. 6. The analysis of thymol capsules. By Atherton Seidell. 7. Seasonal variation in the composition of the thyroid gland. By Atherton Seidell and Frederic Fenger. 8. Note on a new apparatus for use with the Winkler method for dissolved oxygen in water. By Hyman L. Shoub. 9. The pharmacological action of some serum preservatives. By Carl Voegtlin.

No. 97.—1. Some further siphonaptera. 2. A further report on the identification of some siphonapetra from the Philippine Islands. 3. The taxonomic value of the copulatory organs of the females in the order siphonaptera. By Carroll Fox.

No. 98.—Digest of comments on the pharmacopœia of the United States of America (eighth decennial revision) and on the national formulary (third edition) for the calendar year ending December 31, 1913. By Murray Galt Motter and Martin I. Wilbert.

No. 99.—The Friedmann treatment for tuberculosis. A report of the board appointed for its investigation. By John F. Anderson and Arthur M. Stimson.

No. 100.—1. Pituitary standardization; a comparison of the physiological activity of some commercial pituitary preparations. By George B. Roth. 2. Examination of drinking water on railroad trains. By Richard H. Creel. 3. Variation in the epinephrine content of suprarenal glands. By Atherton Seidell and Frederic Fenger.

No. 101.—I. Complement fixation in tuberculosis. By A. M. Stimson. II. Report of an investigation of diphtheria carriers. By Joseph Goldberger, C. L. Williams, and F. W. Hatchel. III. The excretion of thymol in the urine. By Atherton Seidell. IV. The sterilization of dental instruments. By H. E. Hasseltine. V. A modification of Rose's method for the estimation of pepsin. By Maurice H. Givens.

No. 102.—I. Digitalis standardization. The physiological evaluation of fat-free digitalis and commercial digitalin. By George B. Roth. II. Preliminary observations on metabolism in pellagra. By Andrew Hunter, Maurice H. Givens, and Robert C. Lewis.

No. 103.—I. Chemical changes in the central nervous system as a result of restricted vegetable diet. By Mathilde L. Koch and Carl Voegtlin. II. Chemical changes in the central nervous system in pellagra. By Mathilde L. Koch and Carl Voegtlin.

No. 104.—Investigation of the pollution and sanitary conditions of the Potomac watershed with special reference to self-purification and the sanitary condition of shellfish in the lower Potomac River. By Hugh S. Cumming. (Plankton studies, by W. C. Purdy; hydrographic data, by Homer P. Ritter.)

No. 105.—Digest of comments on the pharmacopœia of the United States of America and on the national formulary for the calendar year ending December 31, 1914. By Martin I. Wilbert.

No. 106.—Studies in Pellagra: I. Tissue alterations in malnutrition and pellagra. By John Sundwall. II. Cultivation experiments with the blood and spinal fluid of pellagrins. By Edward Francis. III. Further Attempts to Transmit Pellagra to Monkeys. By Edward Francis.

In citing these bulletins bibliographers and authors are requested to adopt the following abbreviations: Bull. No. —, Hgy. Lab., Wash., pp. —.

The service will enter into exchange of publications with medical and scientific organizations, societies, laboratories, journals, and authors. **ALL APPLICATIONS FOR THESE PUBLICATIONS SHOULD BE ADDRESSED TO THE "Surgeon General, U. S. Public Health Service, Washington, D. C.," EXCEPT THOSE MARKED (*) AND (†).**

The publications marked (*) are no longer available for distribution by the Surgeon General of the Public Health Service. Copies of those marked (†) may, however, be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., who sells publications at cost, and to whom requests for publications thus marked should be made.

ADDITIONAL COPIES
OF THIS PUBLICATION MAY BE PROCURED FROM
THE SUPERINTENDENT OF DOCUMENTS
GOVERNMENT PRINTING OFFICE
WASHINGTON, D. C.
AT
20 CENTS PER COPY

▽

**TREASURY DEPARTMENT
UNITED STATES PUBLIC HEALTH SERVICE**

HYGIENIC LABORATORY—BULLETIN No. 107

JULY, 1916

**CHANGES IN
THE PHARMACOPŒIA AND THE
NATIONAL FORMULARY**

**A DIGEST OF THE
CHANGES AND REQUIREMENTS**

INCLUDED IN

**THE PHARMACOPŒIA OF THE UNITED STATES
(NINTH DECENNIAL REVISION)**

AND IN

**THE NATIONAL FORMULARY
(FOURTH EDITION)**

**WITH REFERENCES TO THE TITLES NOT CONTINUED
FROM THE PRECEDING EDITIONS**

By

MARTIN I. WILBERT



**WASHINGTON
GOVERNMENT PRINTING OFFICE
1917**

“Authority to use for comment the Pharmacopœia of the United States of America, ninth decennial revision, in this volume, has been granted by the board of trustees of the United States Pharmacopœial Convention, which board of trustees is in no way responsible for the accuracy of any translation of the official weights and measures or for any statement as to the strength of official preparations.”

“Permission to use for comment parts of the text of the National Formulary, fourth edition, in this volume, has been granted by the Committee on Publication by authority of the Council of the American Pharmaceutical Association.

ORGANIZATION OF HYGIENIC LABORATORY.

RUPERT BLUE, *Surgeon General.*

United States Public Health Service.

ADVISORY BOARD.

Maj. Eugene R. Whitmore, Medical Corps, United States Army; Medical Inspector E. R. Stitt, United States Navy; Dr. A. D. Melvin, Chief of United States Bureau of Animal Industry; and George W. McCoy, United States Public Health Service, *ex officio*.

Prof. William H. Welch, Johns Hopkins University, Baltimore, Md.; Prof. Simon Flexner, Rockefeller Institute for Medical Research, New York; Prof. Victor C. Vaughan, University of Michigan, Ann Arbor, Mich.; Prof. William T. Sedgwick, Massachusetts Institute of Technology, Boston, Mass.; Prof. M. P. Ravenel, University of Missouri, Columbia, Mo.

LABORATORY CORPS.

Director.—Surg. George W. McCoy.

Assistant Director.—Surg. A. M. Stimson.

Senior pharmacist.—C. O. Sterns, Ph. G.

Junior pharmacist.—Clyde Ritter, Ph. C.

Artist.—Leonard H. Wilder.

DIVISION OF PATHOLOGY AND BACTERIOLOGY.

In charge of division.—Surg. George W. McCoy.

Assistants.—Surgs. Hugh S. Cumming, Leslie L. Lumsden, Lunsford D. Fricks, Carroll Fox, A. M. Stimson; Passed Aast. Surgs. H. E. Hasseltine, James P. Leake; Aast. Surgs. Mather H. Neill, N. E. Wayson, Gleason C. Lake.

DIVISION OF ZOOLOGY.

Professor of zoology.—Ch. Wardell Stiles, Ph. D.

Assistant.—Surg. Joseph Goldberger.

Technical assistant.—Walter D. Cannon, LL. B., A. B., M. D.

DIVISION OF PHARMACOLOGY.

Professor of pharmacology.—Carl Voegtlin, Ph. D.

Technical assistants.—Atherton Seidell, Ph. D.; Murray Galt Motter, A. M., M. D.; Martin I. Wilbert, Ph. M.; George B. Roth, A. B., M. D.

Organic chemist.—Chester N. Myers, Ph. D.

DIVISION OF CHEMISTRY.

Professor of chemistry.—Earle B. Phelps, S. B.

Sanitary chemist.—Albert F. Stevenson, S. B.

Technical assistant.—Elias Elvove, M. S., Pharm. D.

ABBREVIATIONS.

To economize space the following abbreviations have been used in the text:

U. S. P. or U. S. P. IX—The Pharmacopœia of the United States of America, Ninth Decennial Revision, official from September 1, 1916.

U. S. P. VIII—The Pharmacopœia of the United States of America, Eighth Decennial Revision, official from September 1, 1905.

N. F. or N. F. IV—The National Formulary, fourth edition, official from September 1, 1916.

N. F. III—The National Formulary of unofficial preparations, third edition, Baltimore, 1906.

P. I.—Protocol Internationale. The International Treaty respecting the unification of the Pharmacopœial formulas for potent drugs.

(v. per cent)—Per cent of content of active constituent of a preparation by volume.

(w/v per cent)—The relation of weight of active constituent to volume of finished preparation.

gm.—gramme.

Mil or mls—Milliliter or milliliters.

(E)—European Pharmacopœias other than those of Scandinavian countries.

(S)—The Pharmacopœias of Scandinavian countries.

For a list of chemical symbols see table of atomic weights, p. 40.

CONTENTS.

	Page.
Preface	7
History	11
General principles to be followed in revising the Pharmacopœia	15
1. Scope of the Pharmacopœia	16
Table showing the number of titles included in the several national Pharmacopœias.....	16
Table showing the number of additions and dismissals recorded in recent editions of the Pharmacopœia of the United States.....	18
Table giving comparative number and variety of articles included in recent editions of the Pharmacopœia of the United States and in the National Formulary.....	18
Table showing the extent to which the several Pharmacopœias now in use have recognized popular new remedies, with the English equivalents of the more widely used titles.....	19
2. Doses	21
Table showing the highest and lowest maximum daily and single doses of widely used preparations contained in foreign Pharmacopœias with the number of Pharmacopœias in which each article appears.....	22
3. Nomenclature	24
Table showing number of changes in official titles recorded in recent editions of the Pharmacopœia of the United States.....	25
4. Synonyms	25
5. Purity and strength of Pharmacopœial articles	26
6. International standards	27
A comparison of the titles and requirements included in the International Protocol with the titles and requirements of the U. S. P. IX and the N. F. IV.....	28
Table showing total number of compliances and noncompliances with the requirements of the International Protocol.....	30
Table showing preparations in various national Pharmacopœias in 1902 compared with the proposed international standard.....	31
Table showing comparative degree of compliance with the international standard by the several Pharmacopœias, 1916.....	32
Table showing comparative strength of preparations of potent medicaments included in the Brussels Conference Protocol and in the several Pharmacopœias referred to most commonly in the United States.....	33
7. General formulas	34
8. Appending a list of preparations in which an official article is used ...	34
9. Alcoholic percentage in official preparations	35
10. Assay processes	35
11. Serums and other biological products	37
12. Weights and measures	38
13. Supplement	38

	Page.
General principles to be followed in revising the Pharmacopœia—Continued.	
14. Publicity.....	39
15. Atomic weights.....	39
Table of names, symbols, and atomic weights of the elementary bodies mentioned in the Pharmacopœia of the United States and in the National Formulary based on the table adopted by the International Committee on Atomic Weights (1915), 0=16...	40
16. Physical constants.....	40
Definitions of physical constants.....	41
17. Standard temperature.....	41
18. Compound preparations.....	41
19. Pharmacognostical descriptions.....	42
20. Powdered drugs.....	42
21. Diagnostic reagents.....	42
22. Date when the next Pharmacopœia becomes official.....	43
23. Precedents.....	43
24. Solubilities.....	43
Recommendations to the Committee on National Formulary.....	43
Alphabetical list of official Latin titles with changes in requirements designed to show the present status of the articles included in the U. S. P. IX and U. S. P. VIII, and in the N. F. IV and N. F. III.....	49
Alphabetical list of official English titles widely used, synonyms, and trade names, with corresponding Latin titles, of the U. S. P. and N. F.....	293

P R E F A C E .

It is the province of the Pharmacopœia and similar books of standards to insure uniformity in the supply of medicaments for use by physicians in the prevention and cure of disease, and it is generally recognized that such uniformity is necessary if progress in the science and practice of medicine is to be made.

Recognizing the importance of adequate and equitable standards as a safeguard to public health, the United States Public Health Service many years ago undertook to cooperate in the development of standards for prophylactic and curative preparations and the elaboration and perfection of the several books containing these standards.

Furthermore, on the publication of the eighth decennial revision of the Pharmacopœia of the United States of America, in 1905, a bulletin on the changes in that book was prepared and issued as Hygienic Laboratory Bulletin No. 23. This review was received with general favor and was thought by the board of trustees of the United States Pharmacopœial Convention to have assisted greatly in bringing the various changes in the Pharmacopœia to the knowledge of physicians and pharmacists generally.

The board of trustees of the United States Pharmacopœial Convention subsequently requested the cooperation of the Surgeon General of the United States Public Health and Marine Hospital Service in the revision of the Pharmacopœia by compiling and publishing a continuation of the already well established Digest of Comments on the Pharmacopœia. On the request of the Council of the American Pharmaceutical Association, the Surgeon General of the United States Public Health and Marine Hospital Service, with the consent of the Secretary of the Treasury, directed that the Digest of Comments should in future also include a compilation of comments on the National Formulary. Up to the present time 10 volumes of this series of the Digest of Comments, aggregating a total of 5,556 pages, have been published. The number and variety of comments or references alone suffice to emphasize the general recognition accorded to the Pharmacopœia and the National Formulary as standards for the drugs and medicines used in all parts of the United States.

The publication of new editions of the established books of standards for medicines is of necessity accompanied by an element of uncertainty, because of the many changes in the number and kind of drugs and preparations described therein and also because of possible alterations in strength and nomenclature of widely used preparations. These many and varied changes are of importance not alone to the professions of medicine and pharmacy but also to the public, because of the possibility of error and the accompanying harm that may be done by the mistaking of one preparation for another. With the unusually large number of changes evidenced in connection with the revised editions of the Pharmacopœia and the National Formulary the need for safeguarding the consumer is especially emphasized.

Because of the fact that the Pharmacopœia and the National Formulary are in reality separate and distinct publications it was thought that a comprehensive index of the articles described in recent editions of these two books would be of value to public health officials and to all who are in any way interested in the official standards and requirements for drugs and medicines. To provide a readily available means for determining the present status of any official or recently official article an alphabetical list of the titles included in the U. S. P. VIII, the U. S. P. IX, the N. F. III, and the N. F. IV has been compiled with an outline of the changes and requirements that have been embodied in the revised editions of the U. S. P. and the N. F.

The need of the busy official, chemist, or pharmacist for some such general index is evidenced by the fact that the titles included in these several books are now distributed over six alphabetical arrangements and four distinct indexes.

In the following compilation, the changes in strength and composition are indicated as concisely as practicable, and special attention is directed to changes in nomenclature of official articles as well as additions to and deletions from the list of articles included in the several books. In connection with articles transferred from the National Formulary to the Pharmacopœia or from the Pharmacopœia to the National Formulary this fact is specially noted. The information thus presented is in effect a summary of much of the material previously published in the several volumes of the Digest of Comments on the Pharmacopœia of the United States and on the National Formulary.

To emphasize the relative importance of the several official drugs and chemicals a list of the National Formulary preparations in which the official articles are used has been appended. Articles like water, alcohol, glycerin, and sugar, which occur in a large number of preparations, are not so enumerated.

The presentation of this information in connection with the corresponding enumeration of Pharmacopœial preparations, it was thought,

would be of value in that it would tend to call attention to the number and kind of preparations in which the several drugs occur as active or important constituents. So far as practicable the quantities given in connection with the official preparations are based either on a single dose, as in connection with pills and troches, or on the equivalent of 100 grams or 100 mils of the finished preparation, so that the figures given in parenthesis represent per cent by weight or volume, or per cent by weight of drug to volume of the finished liquid preparation (w/v per cent).

In compiling the material an effort has been made to include the official Latin and the official English titles, with the more frequently used synonyms and trade names that appear in current literature.

The English titles and the synonyms have been cross indexed to facilitate reference, and an effort has been made in connection with this index to differentiate between the official English titles and the several synonyms by the use of *italics* for the former. The list of official articles with the accompanying index has been prefaced by a short introductory chapter in which the instructions to the several committees of revision are reviewed in connection with the completed work. The object in mind was to make this publication a practical companion and convenient reference book on the present status of any of the many articles included in either of the four books referred to.

As noted above, this bulletin is designed to serve as an index to the several recent editions of the official standards and can in no sense be considered to take the place of either of these books. For detailed information regarding the composition, strength, tests, and other requirements in connection with the several official articles, readers are referred to the Pharmacopœia and the National Formulary.

M. I. W.

CHANGES IN THE PHARMACOPŒIA AND THE NATIONAL FORMULARY.¹

HISTORY.

So far as known the Pharmacopœia of the United States was for the first time recognized by statute in the drug importation act of 1848. It was later included in several of the State practice of pharmacy laws, and by practice or regulation was generally adopted as the standard for drugs purchased for the several medical departments of the United States Government. It was not until the enactment of the Federal food and drugs act, June 30, 1906, however, that the book received the attention that was properly due it.

According to section 7 of the food and drugs act, June 30, 1906, a drug shall be deemed to be adulterated:

First. If, when a drug is sold under or by a name recognized in the United States Pharmacopœia or National Formulary, it differs from the standard of strength, quality, or purity, as determined by the test laid down in the United States Pharmacopœia or National Formulary official at the time of investigation: *Provided*, That no drug defined in the United States Pharmacopœia or National Formulary shall be deemed to be adulterated under this provision if the standard of strength, quality, or purity be plainly stated upon the bottle, box, or other container thereof, although the standard may differ from that determined by the test laid down in the United States Pharmacopœia or in the National Formulary.

During the decade that has elapsed since the enactment of the Federal food and drugs act, recognition by law of the authority of the Pharmacopœia and of the National Formulary has steadily increased, and at the present time practically every State in the Union has on its statute books laws recognizing these two books as the legal standards for drugs and medicines.

The first general convention for the formation of a National Pharmacopœia assembled in the Capitol at Washington January 1, 1820, and the first Pharmacopœia of the United States was published in Boston under date of December 15, 1820. The national conventions have been held decennially since that time and the Pharmacopœia of the United States has been published regularly in compliance with the principles indorsed by the several national conventions.

The following table serves to show the regularity with which the decennial conventions have assembled and the approximate time

¹ Manuscript submitted for publication May 22, 1916.

consumed in the preparation of the manuscripts for the several editions of the Pharmacopœia of the United States:

Table showing time of decennial meetings of the Pharmacopœia convention and dates of publication of editions of the Pharmacopœia.

Pharmacopœia.	Date of meeting.	Date of publication.
U. S. P.	January, 1820.....	December, 1820.
U. S. P. I.	January, 1830.....	February, 1830.
U. S. P. II.	January, 1840.....	May, 1842.
U. S. P. III.	May, 1850.....	March, 1851.
U. S. P. IV.	May, 1860.....	June, 1863.
U. S. P. V.	May, 1870.....	January, 1873.
U. S. P. VI.	May, 1880.....	October, 1882.
U. S. P. VII.	May, 1890.....	August, 1893.
U. S. P. VIII.	May, 1900.....	July, 1905.
U. S. P. IX.	May, 1910.....	July, 1916.

The sixth revision (1880) marked a very radical departure from established precedents. In this revision all articles were arranged in alphabetical order, a new chemical nomenclature was introduced, comprehensive descriptions of crude drugs and of chemicals were for the first time made a prominent feature, and quantities in the formulas were stated in "parts by weight," thus effectually introducing the metric system of weights and measures into American pharmacy.

In the seventh revision (1890) the adoption of the metric system of weights and measures was completed and methods of assay for energetic or otherwise important drugs which had previously been only tentatively included in the Pharmacopœia were in this edition elaborated on and increased in number. Several of the so-called newer remedies were for the first time recognized in this edition of the Pharmacopœia.

The United States Pharmacopœial Convention which met in Washington to prepare for the eighth revision (May, 1900) elected a board of trustees to transact the business of the organization, and the Committee of Revision was thereby enabled to devote itself entirely to the immediate duties of revision work.

This convention also instructed the newly elected board of trustees to take out articles of incorporation for the convention under the laws of the District of Columbia, thus establishing the organization on a more permanent foundation.

The eighth decennial revision of the Pharmacopœia of the United States included an unusually large number of changes, many of which were made in compliance with the recommendations of the International Conference for the unification of pharmacopœial formulas of potent medicines, which was held in the city of Brussels in September, 1902. These changes, in addition to many of more or less minor importance, due to the establishment of definite standards for pharmacopœial preparations, included 22 articles in which the strength was materially increased, and 35 articles in which the strength of the prepara-

tion was markedly decreased. The same pharmacopœia also included a large number of changes in the nomenclature. Among the innovations introduced in this revision, it will suffice to enumerate the introduction of the purity rubric, the introduction of antidiphtheric serum, and the introduction of average doses.

The enactment of the food and drugs act, June 30, 1906, necessitated a review of the requirements of the Pharmacopœia, so as to insure ready compliance on the part of manufacturers and others who were expected to conform strictly with the at times stringent and unusually high standards. A number of modifications in the original requirements of the Pharmacopœia were authorized, and these were published in 1907 in the form of a supplement, entitled, "Additions and Corrections to June 1, 1907."

A Spanish translation of the eighth revision of the Pharmacopœia of the United States, prepared under the direction of the board of trustees, was published in 1909. This Spanish edition of the Pharmacopœia was well received in the Spanish-speaking countries of Central and South America, and has been adopted by statute as the standard for drugs and medicines in Cuba.

A new series of the Digest of Comments was authorized in this revision, and on the request of the board of trustees of the United States Pharmacopœial Convention, the work of compiling and publishing the same was done under the supervision of the Public Health and Marine Hospital Service.

The convention which met in Washington in 1910 also instituted and authorized a number of important changes in the Pharmacopœia and in the method of its making. The Revision Committee, which in recent decades had consisted of 25 members, was changed to include a general committee of revision consisting of 50 members and an executive committee of revision of 15 members, to be selected from the membership of the general committee. This executive committee of revision is in effect the body responsible for the composition, content, and requirements of the Pharmacopœia itself.

A number of special features of unusual interest and value were provided for by the convention. Many of these will be discussed at length in connection with the appended review of the general principles to be followed in the revision of the Pharmacopœia, as outlined by the convention. A few, however, may be mentioned here. In addition to the very decided increase in the number of assay processes for drugs, chemicals, and preparations, the Committee of Revision has embodied more specific directions for preserving chemicals, drugs, and galenical preparations. In many instances special precautions are prescribed to prevent deterioration. In connection with a few drugs, as with almonds, for instance, the drug is directed to be preserved in tightly closed containers in which a few drops of chloroform or carbon tetrachloride are to be added from time to time to prevent attack by insects.

The former appendix to the Pharmacopœia is now designated as Part II, and includes a more systematic arrangement of its contents than heretofore. The list of reagents, test solutions, and volumetric solutions has been materially enlarged, and in connection with many of the tests the committee has deemed it wise to add explanatory remarks or instruction in details of manipulation. Part II also contains a short chapter on sterilization, and a corresponding chapter on percolation. The number of tables has been materially augmented, and the list now includes tables of thermometric equivalents, alcoholometric tables, and tables of temperature correction for the alcoholometric tables; also acid and alkali tables for acetic acid, hydrochloric acid, nitric acid, sulphuric acid, and ammonia. Part I of the Pharmacopœia of the United States contains a total of 782 titles. The total for the two parts of the National Formulary aggregates 781 titles, or a total of 1,567 titles for the two books, as compared with 1,575 in the two books previously official, a reduction of 12.

The changes in the official titles of the Pharmacopœia total 57, as compared with 297 changes of titles in the U. S. P. VIII, and 283 changes of titles in the U. S. P. VII. The list of changes of Latin titles in the N. F. totals 102.

The more important changes in the present revision of the Pharmacopœia of the United States embody a very distinct reduction in the number of articles enumerated, an increase in the number of articles for which a purity rubric has been adopted and an even more marked increase in the number of assay processes for pharmacopœial drugs and preparations. The introduction of assay processes for all articles for which a purity rubric is included will facilitate control of drugs and medicines and should go far toward securing greater uniformity in the composition and purity of official articles. The number of changes in the composition and strength of official preparations is not so great as in the revision of ten years ago. As will be pointed out later, the changes that have been made were designed to bring the Pharmacopœia of the United States more fully in accord with the requirements of the international agreement respecting the unification of the pharmacopœial formulas for potent medicaments signed at Brussels, November 29, 1906.

The number of changes in strength does not by any means reflect the work that has actually been done. Even a superficial comparison of the present Pharmacopœia with the preceding one will show that the U. S. P. IX represents the most comprehensive revision of the official text that has been had up to the present time. Practically every monograph has been rewritten, and the tests and requirements throughout have been materially altered.

The general recognition of the fact that the Pharmacopœia of the United States supplies formulas for only a limited number of the

more commonly used medicines led to the preparation and publication of formularies or books of standard formulas for many of the more or less extensively used preparations.

These at first independent efforts culminated in the publication of the National Formulary by the American Pharmaceutical Association in 1888; a revised issue of the book was published in 1896, and a second revision appeared in 1906.

The inclusion of the National Formulary in the pure food and drugs act of June 30, 1906, and its subsequent inclusion in a number of State food and drug laws as a legal standard for the drugs and preparations described therein, gave to this book a new and important status. The present edition (fourth issue) of the National Formulary is the first to be revised and prepared wholly with a view of serving as an equitable and generally acceptable standard for the drugs and preparations described in the monographs that are included in the book. In how far the committee has been able to meet the new responsibilities of the book remains to be learned, but there can be no difference of opinion that the Committee on National Formulary has labored long and assiduously to compile a book that would fully meet the needs of the several, at times divergent, interests that depend on standards of this kind.

The general principles adopted by the members of the United States Pharmacopœial Convention and by the members of the American Pharmaceutical Association in general session are in effect the requirements by which the products of revision are to be measured.

Members of these two associations and others who are interested in the development or in the use of the established standards for drugs will no doubt be interested in a connected comparison of the accomplishments of the committees of revision with the requirements as laid down in the general principles outlined or indorsed by the parent associations.

GENERAL PRINCIPLES TO BE FOLLOWED IN REVISING THE PHARMACOPŒIA.

As now constituted the United States Pharmacopœial Convention includes accredited delegates from incorporated medical pharmaceutical and chemical associations and medical and pharmaceutical schools and colleges. It also includes delegates from a limited number of the several departments of the United States Government, which in the recent (1910) convention was represented by delegates from the United States Public Health Service, Treasury Department; the Bureau of Medicine and Surgery, United States Navy Department; the Surgeon General's Office, United States War Department; and the United States Department of Agriculture.

The decennial meetings of the United States Pharmacopœial Convention are devoted primarily to the election of officers and a

committee of revision, to which the necessary work of revising and publishing the Pharmacopœia is intrusted. For a number of decades the members of the Pharmacopœial Convention have also discussed and indorsed a general outline of the scope and the methods to be followed in revising the Pharmacopœia. At the convention held in Washington in 1910, 24 separate recommendations were discussed and indorsed under the caption "General principles to be followed in the revision of the Pharmacopœia." These several recommendations were published in the abstract of the Proceedings of the United States Pharmacopœial Convention, Washington, 1910, and are also reprinted in the introductory pages to the Pharmacopœia itself. They are here presented and commented on in the sequence in which they were indorsed by the convention.

1. SCOPE OF THE PHARMACOPŒIA.

We recommend that the Committee of Revision be authorized to admit into the Pharmacopœia any medicinal substance of known origin, but no substance or combination of substances shall be introduced if the composition or mode of manufacture thereof be kept secret or if it be controlled by unlimited proprietary or patent rights and the list of substances should be carefully selected with standards for identity and purity as far as possible. Substances used only for technical purposes should not be admitted to the next Pharmacopœia and a statement should be placed in the preface to the effect that standards of purity and strength prescribed in the text of the Pharmacopœia are intended solely to apply to substances which are used for medicinal purposes or in determining the identity and purity of the same.

No one feature of the Pharmacopœia has been more generally discussed than the question of scope. In connection with the several volumes of the Digest of Comments that have been published this discussion has been reviewed at some length, and because of the comprehensiveness of the subject it must suffice to call attention to the references that are included under the general heading "Scope" in the Digest of Comments enumerated above. The appended table showing the number of titles included in the several National Pharmacopœias serves to show at a glance the comparative scope and content of these several national books of standards:

Table showing the number of titles included in the several National Pharmacopœias.

Pharmacopœia.	Published.	Total titles.	General headings.	Drugs.	Chemicals.	Preparations.
Spanish VII.....	1905	1,073	0	269	260	544
Dutch IV.....	1905	673	17	200	182	274
Japanese III.....	1906	706	14	204	207	281
Belgian III.....	1906	722	25	135	173	339
Austrian VII.....	1906	698	19	232	180	287
Danish VIII.....	1907	499	22	142	144	181
Swiss IV.....	1907	853	29	244	227	353
Swedish IX.....	1908	583	19	144	179	241
French V.....	1908	1,122	48	271	283	510
Italian III.....	1909	669	18	164	193	294
Hungarian III.....	1909	551	18	142	187	204
German V.....	1910	671	34	191	202	244
Norwegian IV.....	1913	543	17	149	169	208
British V.....	1914	816	0	184	206	426
United States IX.....	1916	782	9	188	265	320

The deletions from the Pharmacopœia are more numerous than in any previous edition, while the additions are fewer in number.

The list of articles dismissed from the Pharmacopœia includes a total of 242 titles, among them 49 chemical substances, 67 drugs, and 126 preparations. The list of preparations deleted from the Pharmacopœia includes 3 cerates, 2 confections, 1 elixir, 4 plasters, 2 emulsions, 8 extracts, 38 fluid extracts, 4 solutions, 2 mixtures, 2 mucilages, 4 oleates, 7 pills, 2 powders, 10 tinctures, 4 troches, 4 ointments, and the entire list of 10 wines. In connection with the latter class of preparations it is pointed out that wine as a menstruum or solvent can with advantage be replaced by alcohol of various strengths and the uncertainties of the resulting preparations, owing to the variability in quality and the alcoholic content of the wines of commerce, are thus avoided.

The list of articles added to Part I of the Pharmacopœia includes a total of 66 titles, 33 of which are for chemicals, 7 for drugs, 8 for biological products, and 18 for preparations. The latter list includes 3 plasters, 5 extracts, 2 fluid extracts, 2 solutions, and 2 magmas, the latter being a new class of preparation introduced into the Pharmacopœia for the first time, though one, magma magnesia, had previously been included in the National Formulary.

The list of additions to the U. S. P. IX fails to include a number of the more widely used synthetic remedies and several drugs and products occurring in nature, but which are ostensibly protected by patent or other claims to proprietorship.

The inclusion of the National Formulary in the food and drugs act as a standard has permitted the deletion of a number of compound preparations from the Pharmacopœia. The consensus of opinion of the committee was in effect to provide standards for crude vegetable drugs, chemical substances, and such pharmaceutical substances as are most largely used and are simple in their character.

The present Pharmacopœia includes a total of 782 titles and monographs as compared with 958 titles included in the previous Pharmacopœia. In the present Pharmacopœia there are 242 reagents and test solutions, 27 volumetric solutions, and 18 indicators described in the list of test solutions and volumetric solutions, while in the U. S. P. VIII, there were 124 reagents and test solutions, 23 volumetric solutions, and 9 indicators.

The list of additions and deletions is reflected in the appended table, showing the number of additions and dismissals in recent editions of the U. S. P. and in the table showing the comparative number and variety of articles included in recent editions of the U. S. P. and N. F. The latter table shows the comparative number of vegetable, chemical, and animal drugs, also the number of galeni-

cal preparations in the several recent editions of the Pharmacopœia of the United States of America, and serves to illustrate the gradual evolution of the scope of the Pharmacopœia.

Table showing the number of additions and dismissals in recent editions of the Pharmacopœia of the United States.

	U. S. P. VI.	U. S. P. VII.	U. S. P. VIII.	U. S. P. IX.
Additions.....	256	88	121	66
Dismissals.....	229	92	155	242
Total.....	485	180	276	308

Table giving comparative number and variety of articles included in recent editions of the Pharmacopœia of the United States and in the National Formulary.

	U. S. P. VI, 1862.	U. S. P. VII, 1893.	U. S. P. VIII, 1905.	U. S. P. IX, 1916.	N. F. IV, 1916.
Vegetable.....	264	255	220	163	140
Animal.....	15	18	21	25	6
Chemical.....	283	239	268	265	42
Galenic.....	481	473	443	320	584
General formulas.....	4	5	6	9	12
Total.....	997	990	958	782	784

As in the previous revision of the Pharmacopœia the newer remedies or synthetic preparations that have been included are found under their chemical rather than under their trade names, though in connection with at least a few the trade name has been included as a synonym.

Table showing the extent to which the several Pharmacopœias now in use have recognised popular new remedies, with the English equivalents of the more widely used titles.

	Ph. Austr. VIII, 1906.	Ph. Belg. III, 1906.	Ph. Brit. V, 1914.	Ph. Dan. VII, 1907.	Ph. Fr. V, 1914.	Ph. Germ. V, 1910.	Ph. Helv. IV, 1907.	Ph. Hesp. VII, 1906.	Ph. Hung. III, 1909.	Ph. Ital. III, 1909.	Ph. Japon. III, 1907.	Ph. Ndl. IV, 1906.	Ph. Norw. IV, 1913.	Ph. Ross. VI, 1910.	Ph. Serb. II, 1908.	Ph. Svec. IX, 1908.	U. S. P. IX, 1916.
Acetanilid (Antifebrin).....	X								X					X			
Acid. Picric.....		X	X	X	X	X	X	X	X								
Adrenalin (L-Suprarenin).....																	
Adrenalin (L-Suprarenin).....																	
Adrenalin, Solution of.....																	
Andipyrine.....																	
Aristol (Thymol Iodide).....																	
Aspirin (Acetylsalicylic Acid).....																	
Atropin (Phenylcinchonic Acid).....																	
Beta-Eucaine Hydrochloride.....																	
Beta-Eucaine Lactate.....																	
Betanaphthol Benzate.....																	
Bismuth Subgalate.....																	
Bismuth Tribromphenolate (Xeroform).....																	
Caffeine Sodio-benzoate.....																	
Caffeine Sodio-salicylate.....																	
Calcium Lactate.....																	
Cantharidin.....																	
Chloral Formamide.....																	
Cosarine Hydrochloride (Stypticin).....																	
Cressote Carbonate.....																	
Diacetyl Morphine (Heroin).....																	
Diacetyl Morphine Hydrochloride (Heroin Hydrochloride).....																	
Ethyl Morphine Hydrochloride (Dionin).....																	
Guaiacol Carbonate.....																	
Hexamethylenetetramine (Hexamethylenamine).....																	
Lactophenin (Lactylphenetid).....																	
Methylene Blue.....																	
Nitrous Oxide.....																	
Novocain.....																	
Oxyzen.....																	
Phenacetin (Acetphenetid).....																	
Phenolphthalein.....																	
Protargol.....																	
Pyramidon.....																	
Quinine Ethyl Carbonate.....																	
Saccharin (Benzosulphinide).....																	

1 Supplements: Ph. Ndl. I, 1910; II, 1914. Ph. Belg. I, 1913.

Table showing the extent to which the several Pharmacopœias now in use have recognized popular new remedies, with the English equivalents of the more widely used titles—Continued.

	Ph. Austr. 1906, VIII,	Ph. Belg. 1906, III,	Ph. Brit. 1914, V,	Ph. Den. 1907, VII,	Ph. Fr. V, 1914,	Ph. Germ. V,	Ph. Helv. IV,	Ph. Hsp. 1906, VII,	Ph. Hung. III,	Ph. Ital. 1909, III,	Ph. Japon. III,	Ph. Ndl. 1906, IV,	Ph. Norw. IV,	Ph. Russ. VI,	Ph. Serb. II,	Ph. Svec. IX,	U. S. P. IX, 1916,
Salpyrine.....	X	X			X	X	X				X	X	X	X	X	X	X
Salol (Phenyl Salicylate).....					X	X	X					X	X	X	X	X	X
Salophen.....					X	X	X					X	X	X	X	X	X
Serum, Antidiphtheric.....					X	X	X					X	X	X	X	X	X
Serum, Antifebrile.....					X	X	X					X	X	X	X	X	X
Sodium Arseniate.....					X	X	X					X	X	X	X	X	X
Sodium Cacodylate.....					X	X	X					X	X	X	X	X	X
Sodium Methyl Arsenite (Arrhenal).....					X	X	X					X	X	X	X	X	X
Sulphonal.....					X	X	X					X	X	X	X	X	X
Stovaine.....					X	X	X					X	X	X	X	X	X
Tannalbin.....					X	X	X					X	X	X	X	X	X
Tannigen.....					X	X	X					X	X	X	X	X	X
Tannuform.....					X	X	X					X	X	X	X	X	X
Theobromine.....					X	X	X					X	X	X	X	X	X
Theobromine Sodio-salicylate (Diuretin).....					X	X	X					X	X	X	X	X	X
Theophyllin (Theocin).....					X	X	X					X	X	X	X	X	X
Trional (Methyl Sulphonal).....					X	X	X					X	X	X	X	X	X
Trioxymethylene.....					X	X	X					X	X	X	X	X	X
Tropacocaine Hydrochloride.....					X	X	X					X	X	X	X	X	X
Tuberculin.....					X	X	X					X	X	X	X	X	X
Urethane (Ethyl Carbamate) (Diuretin).....					X	X	X					X	X	X	X	X	X
Vaccine Virus.....					X	X	X					X	X	X	X	X	X
Veronal.....					X	X	X					X	X	X	X	X	X

¹ Supplements: Ph. Ndl. I, 1910; II, 1914. Ph. Belg. I, 1913.

2. DOSES.

We recommend that after each pharmacopœial article (drug, chemical, or preparation) which is used or likely to be used internally or hypodermically, the committee be instructed to state the average approximate (but neither a minimum nor a maximum) dose for adults and, where deemed advisable, also for children. The metric system to be used, and the approximate equivalent in ordinary weights or measures inserted in parentheses. It is to be distinctly understood that neither this convention nor the Committee of Revision created by it intends to have these doses regarded as obligatory on the physician or as forbidding him to exceed them whenever in his judgment this seems advisable. The committee should be directed to make a distinct declaration to this effect in some prominent place in the new Pharmacopœia.

In compliance with the recommendations made in connection with doses, the Committee of Revision has retained the average dose statement. The doses have been carefully revised and will be found to be in accord with our present-day knowledge of the action and uses of drugs.

The preface to the U. S. P. states:

It is to be distinctly understood that neither the convention nor the Committee of Revision created by it intended to have these doses obligatory on the physician or as forbidding him to exceed them whenever in his judgment this seems advisable. The doses are given in both the metric and apothecaries' systems, but the figures are not interchangeable nor are they to be considered as equivalents.

The refusal to include in the Pharmacopœia of the United States a list of maximum doses has in the past been based on the supposition that no such limit of dose can reasonably well be established and that any arbitrary limit would tend to subject physicians to unnecessary annoyance.

Pharmacists, on the other hand, have always contended that the inclusion of maximum doses in the Pharmacopœia would be a desirable safeguard and would at least serve as a guide in dispensing the more potent drugs and preparations.

Practically all of the European pharmacopœias include tables of maximum single and daily doses. The appended table gives a comparative review of these official maximum doses and emphasizes the generally recognized fact that maximum doses are at best arbitrary and that, as yet, we have little or no satisfactory basis for uniformity in dose requirements.

The following is a list of the Pharmacopœias on which the appended table is based:

Ph. Ndl. IV, 1905.
Ph. Japon. II, 1906.
Ph. Belg. III, 1906.
Ph. Austr. VIII, 1906.
Ph. Dan. VIII, 1907.
Ph. Helv. IV, 1907.
Ph. Svec. IX, 1908.

Ph. Fr. V, 1908.
Ph. Serb. II, 1908.
Ph. Ital. III, 1909.
Ph. Hung. III, 1909.
Ph. Ross. V, 1910.
Ph. Germ. V, 1910.

22 CHANGES IN PHARMACOPŒIA AND NATIONAL FORMULARY.

Table showing highest and lowest maximum single and daily doses, of widely used drugs, and preparations, contained in foreign pharmacopœias, with the number of pharmacopœias in which each article occurs.

Name.	Number of times mentioned.	Highest maximum—				Lowest maximum—			
		Single dose.		Daily dose.		Single dose.		Daily dose.	
		Gm.	Grains or minims.	Gm.	Grains or minims.	Gm.	Grains or minims.	Gm.	Grains or minims.
Acetanilidum.....	10	0.50	8	2.00	30	0.30	5	1.50	23
Acetphenetidinum.....	11	1.00	15	4.00	60	.50	8	2.00	30
Acidum hydrocyanicum dilutum.....	5	.10	1½	.50	8	.10	1½	.30	5
Aconitum.....	6	.12	2	.50	8	.10	1½	.30	5
Amyli Nitræ.....	4	.20	3	1.40	21	.05	1	.30	5
Antimonii et Potassii Tartras.....	12	.20	3	.60	10	.10	1½	.30	5
Antipyrina.....	10	4.00	60	8.00	120	1.00	15	3.00	45
Apomorphinæ Hydrochloridum.....	13	.02	½	.06	1	.01	½	.05	1
Argentii Nitræs.....	12	.03	½	.20	3	.01	½	.04	½
Arseni Trioxidum.....	13	.006	⅙	.020	⅓	.005	⅙	.010	⅓
Aspirin.....	3	1.0	15	6.0	90	1.0	15	5.0	75
Atropinæ Sulphas.....	13	.001	⅙	.003	⅙	.001	⅙	.003	⅙
Belladonnæ Folia.....	10	.20	3	.60	10	.10	1½	.20	3
Bromoformum.....	6	.50	8	1.50	23	.50	8	1.50	23
Caffeina.....	11	.50	8	2.00	30	.20	3	.60	10
Caffeina Citrata.....	2	1.00	15	3.00	45	.60	10	2.00	30
Caffeina Sodio Benzoas.....	6	1.00	15	6.00	90	.50	8	1.50	23
Cantharis.....	11	.05	8	.20	3	.025	½	.100	1½
Chloralum Hydratum.....	13	4.00	60	12.00	180	2.00	30	4.00	60
Chloroformum.....	5	.50	8	3.00	45	.50	8	1.00	15
Cocainæ Hydrochloridum.....	13	.05	1	.15	2½	.03	½	.06	1
Codæina.....	7	.10	1½	.30	5	.05	1	.20	3
Codæinæ Hydrochloridum.....	6	.10	1½	.30	5	.05	1	.20	3
Codæinæ Phosphas.....	7	.10	1½	.30	5	.075	1½	.30	5
Colocyntidis.....	8	.40	6	1.00	15	.30	5	1.00	15
Cresotum.....	12	.50	8	2.00	30	.20	3	1.00	15
Cupri Sulphas.....	8	1.00	15	1.00	15	.50	8		
Diacetyl-morphinæ.....	2	.01	½	.05	1	.01	½	.02	½
Diacetyl-morphinæ hydrochloridum.....	5	.01	½	.03	½	.006	⅙	.015	½
Digitalis.....	13	.20	3	1.00	15	.10	1½	.80	12
Epinephrina.....	3	.002	⅙	.004	⅙	.001	⅙		
Ergota.....	10	1.00	15	5.00	75	1.00	15	3.00	45
Ethyl-morphinæ Hydrochloridum.....	5	.05	1	.15	2½	.03	½	.10	1½
Extractum Belladonnæ.....	12	.05	1	.20	3	.02	½	.08	1½
Extractum Cannabis Indicæ.....	9	.10	1½	.30	5	.05	1	.15	2½
Extractum Colocyntidis.....	10	.05	1	.25	4	.05	1	.15	2½
Extractum Hyoscyami.....	13	.20	3	.80	12	.06	1	.30	5
Extractum Nucis Vomice.....	13	.05	1	.15	2½	.025	½	.050	1
Extractum Opil.....	12	.15	2½	.50	8	.06	1	.20	3
Fluidextractum Ergotæ.....	9	1.00	15	6.00	90	.50	8	2.00	30
Fluidextractum Hydrastis.....	2	1.00	15	4.00	60	1.00	15	4.00	60
Guaiacol.....	5	.50	8	2.00	30	.30	5	1.00	15
Guaicollis Carbonas.....	6	1.00	15	5.00	75	.50	8	2.00	30
Hexamethylenamina.....	1	1.00	15	3.00	45				
Homatropinæ Hydrobromidum.....	6	.001	⅙	.003	⅙	.001	⅙	.003	⅙
Hydrargyri Chloridum Corrosivum.....	13	.03	½	.10	1½	.01	½	.03	½
Hydrargyri Chloridum Mite.....	4	.60	10	1.80	27	.50	8	1.00	15
Hydrargyri Cyanidum.....	5	.02	½	.06	1	.01	½	.03	½
Hydrargyri Iodidum Flavum.....	8	.05	1	.20	3	.02	½	.06	1
Hydrargyri Iodidum Rubrum.....	11	.02	½	.06	1	.015	½	.05	1
Hydrargyri Oxidum Flavum.....	10	.03	½	.10	1½	.02	½	.06	1
Hydrargyri Oxidum Rubrum.....	4	.02	½	.10	1½	.02	½	.06	1
Hydrargyri Salicylas.....	6	.06	1	.06	1	.015	½	.06	1
Hydrastina.....	1	.10	1½	.30	5				
Hyoscyamus.....	10	.40	6	1.20	18	.20	3	.60	10
Iodoformum.....	11	.20	3	1.00	15	.10	1½	.60	10
Iodum.....	10	.03	½	.10	1½	.01	½	.05	1
Liquor Potassii Arsenitis.....	13	.50	8	2.00	30	.20	3	1.00	15
Lobelia.....	3	.10	1½	.30	5	.10	1½	.30	5
Methylis Salicylas.....	1	2.00	30	6.00	90				
Morphinæ Hydrochloridum.....	13	.03	½	.10	1½	.02	½	.06	1½
Morphinæ Sulphas.....	1	.03	½	.10	1½				
Nux Vomica.....	12	.20	3	.80	12	.10	1½	.20	3
Oleoresina Aspidii.....	6	15.00	240	15.00	240	8.0	120	8.0	120
Oleum Tiglii.....	13	.05	1	.15	2½	.05	1	.10	1½

Table showing highest and lowest maximum single and daily doses, of widely used drugs, and preparations, contained in foreign pharmacopœias, with the number of pharmacopœias in which each article occurs—Continued.

Name.	Number of times mentioned.	Highest maximum—				Lowest maximum—			
		Single dose.		Daily dose.		Single dose.		Daily dose.	
		Gm.	Grains or minims.	Gm.	Grains or minims.	Gm.	Grains or minims.	Gm.	Grains or minims.
Opil Pulvis.....	13	.20	3	.60	10	.10	1½	.40	6
Paraldehydum.....	7	5.00	75	10.00	150	3.00	45	8.00	120
Phenol.....	11	.10	1½	.50	8	.03	½	.20	3
Phenyls Salicylas.....	6	2.00	30	6.00	90	1.50	23	5.00	75
Phosphorus.....	13	.001	⅞	.005	⅞	.001	⅞	.003	⅞
Physostigminæ Salicylas.....	11	.001	⅞	.003	⅞	.001	⅞	.003	⅞
Physostigminæ Sulphas.....	2	.001	⅞	.003	⅞	.001	⅞	.003	⅞
Pilocarpinæ Hydrochloridum.....	13	.03	½	.06	1	.02	⅞	.04	½
Plumbi Acetas.....	13	.10	1½	.50	8	.05	1	.25	4
Pulvis Ipecacuanhæ et Opil.....	9	1.50	23	6.00	90	1.00	15	3.75	56
Resina Jalapæ.....	4	1.00	15	3.00	45	.15	2½	.50	8
Resina Podophylli.....	11	.10	1½	.30	5	.50	8	1.50	23
Resorcinol.....	8	1.25	19	5.00	75	.50	8	1.50	23
Santoninum.....	13	.10	1½	.40	6	.10	1½	.30	5
Scilla.....	4	.50	8	1.50	23	.20	3	.60	10
Scopolaminæ Hydrobromidum.....	6	.0005	⅞	.002	⅞	.0005	⅞	.001	⅞
Sodii Arsenas.....	4	.010	⅞	.030	⅞	.005	⅞	.01	⅞
Sodii Arsanias.....	1	.20	3						
Sodii Cacodylas.....	3	.20	3	.20	3	.05	1	.15	2½
Sodii Nitris.....	2	.30	5	1.00	15	.10	1½	.30	5
Sparteinæ Sulphas.....	2	.20	3	.60	10	.05	1	.25	4
Stramonium.....	6	.30	5	1.00	15	.20	3	.50	8
Strophanthinum.....	1	.0003	⅞	.001	⅞				
Strychninæ Nitras.....	12	.01	⅞	.02	⅞	.003	⅞	.01	1½
Strychninæ Sulphas.....	1	.006	⅞	.018	⅞				
Sulphonethylmethanum.....	10	2.00	30	4.00	60	2.00	30	2.00	30
Sulphonmethanum.....	13	2.00	30	6.00	90	2.00	30	2.00	30
Theobrominæ Sodio-Salicylas.....	10	1.00	15	8.00	120	1.00	15	3.00	45
Tinctura Aconiti.....	7	.50	8	1.50	23	.40	6	1.00	15
Tinctura Belladonnæ.....	9	1.00	15	4.00	60	.40	6	1.00	15
Tinctura Cannabis Indicæ.....	4	1.25	19	3.75	57	0.40	6	1.00	15
Tinctura Cantharidis.....	12	.50	8	1.50	23	0.20	3	0.60	10
Tinctura Colchici Seminis.....	12	2.00	30	6.00	90	1.00	15	3.00	45
Tinctura Digitalis.....	13	2.00	30	10.00	150	.90	14	2.70	40
Tinctura Hyocyami.....	2	1.20	18	3.00	45	1.00	15	4.00	60
Tinctura Iodi.....	11	.30	5	1.00	15	.15	2½	.60	10
Tinctura Lobellæ.....	12	2.00	30	5.00	75	1.00	15	3.00	45
Tinctura Nucis Vomice.....	13	2.50	38	5.00	75	.50	8	2.00	30
Tinctura Opil.....	13	2.00	30	6.00	90	.60	10	2.50	38
Tinctura Opil Crocata.....	11	2.00	30	6.00	90	.60	10	2.50	38
Tinctura Scillæ.....	4	2.00	30	6.00	90	1.50	23	5.00	75
Tinctura Strophanthi.....	13	.50	8	2.00	30	.25	4	1.00	15
Veratrina.....	10	.005	⅞	.02	⅞	.002	⅞	.01	⅞
Veronal.....	4	1.00	15	2.00	30	.75	12	1.50	23
Zinci Sulphas.....	8	1.00	15	1.00	15	.50	8	.50	8

It is rather disappointing to find that the Committee of Revision has reintroduced into the Pharmacopœia almost unchanged the tables of approximate measures that were included in the eighth revision of the Pharmacopœia. In connection with the metric system this effort to force the use of equivalents that are not in compliance with the practices in countries where the metric system is thoroughly well established is altogether unfortunate.

The almost universal practice to-day is to accept 5 mils (c. c.) as the equivalent of 1 teaspoonful and to consider the relation of tea, dessert, and tablespoonfuls as 1; 2; 3. The equivalents included in the Pharmacopœia, 4, 8, and 15 mils, are not decimal quantities, do

not readily lend themselves to the popular use of the metric system of weights and measures, and are not in accord with the actual capacity of spoons which they are said to represent. (See American Medicine, 1905, v. 10, p. 954-956.)

The widespread use of drops as dose measures lead to the adoption by the International Convention (1902) of a dropping device that will yield approximately uniform drops for different medicaments. This international drop counter, as it is called, has been included in practically all of the recently published European Pharmacopœias, but is not referred to in the U. S. P. IX.

3. NOMENCLATURE.

We recommend that changes in the titles of articles at present official be made only for the purpose of insuring greater accuracy, brevity, or safety in dispensing, and to eliminate therapeutically suggestive titles. In the case of newly admitted articles, it is recommended that such titles be chosen as are in harmony with general usage and convenient for prescribing, but in the case of chemicals of a definite composition, the scientific name should be given at least as a synonym.

There should also be inserted, after each article used by physicians in prescriptions, a carefully considered abbreviated name, which may be known as an official abbreviation, in order that uniformity may be established throughout the country with the object of preventing mistakes in reading and compounding prescriptions, and further, to serve as authorized abbreviations in labeling the store furniture of the pharmacist.

The list of changes of English as well as of Latin names is materially smaller than was the corresponding list in the U. S. P. VIII. The more important changes in connection with the matter of nomenclature are the inclusion of official abbreviations and the rather liberal use of synonyms.

The chemical and botanical nomenclature is substantially the same as that adopted for the eighth revision. In the case of new articles the terminology and latinization is in accord with the plan adopted for the former revision. Some botanical changes have been made in the light of further knowledge in this subject, but in most cases Engler and Prantl have been followed as authorities.

For chemical substances several methods for expressing symbolic formulas have been adopted. Throughout the text the condensed formulas are given, and where it was thought desirable the structural characteristics are also indicated.

A new feature in connection with the U. S. P. IX is the introduction of abbreviations of the official Latin titles. It is believed that these abbreviations will be of service to physicians in writing prescriptions and to pharmacists in labeling bottles for their store furniture. Practically the same abbreviations have been included in the fifth edition of the British Pharmacopœia, published in 1914, and it is expected that uniformity will thus be secured throughout

all English-speaking countries and possible danger, through faulty abbreviations, avoided.

In all instances in which U. S. P. IX articles which are included in the Brussels treaty of 1906 practically conform to the standards outlined in the International Protocol, the more widely used of the titles suggested have been included as synonyms, followed by the letters P. I. (Protocol Internationale).

The following table, showing the number of changes in official titles recorded in recent editions of the Pharmacopœia of the United States, serves to call attention to the number and the nature of the changes that have been made:

Table showing the number of changes in official titles recorded in recent editions of the Pharmacopœia of the United States.

Pharmacopœias.	Changes in Latin titles.	Changes in English titles.	Total number of changes.
U. S. P. VI, 1880.....	94	161	255
U. S. P. VII, 1890.....	58	225	283
U. S. P. VIII, 1900.....	142	155	297
U. S. P. IX, 1910.....	29	28	57

For information, and for the purpose of calling attention to the desirability of bringing about greater uniformity in the nomenclature of potent and widely used remedies, an effort has been made in connection with the accompanying compilation of titles and requirements to include a number of the more frequently used foreign titles as synonyms.

4. SYNONYMS.

We recommend that the list of synonyms should be enlarged for the next revision, and the synonyms printed in the text of the Pharmacopœia immediately after the English name of the substance. A statement should be made in the preface of the Pharmacopœia that substances labeled with an official synonym must comply with the same standards, tests, and requirements as are demanded for the official article under any name.

In compliance with the recommendations of the convention the number of synonyms included in the Pharmacopœia has been materially increased. The appended list of official preparations includes in addition to some of the less frequently used synonyms and trade names, also an enumeration of the official titles under which the more important articles and preparations are recognized in foreign pharmacopœias. In a general way it may be said that the names of the British Pharmacopœia comply rather closely with the titles of the U. S. P. and the remaining foreign Pharmacopœias may be classed in two groups, the central or southern European group of countries and the northern or Scandinavian group, in which the Berzelian form of nomenclature is still used. The latter group includes the

Swedish, Norwegian, Danish, and Finnish pharmacopœias and the Latin synonyms in the Netherlands Pharmacopœia.

In the accompanying compilation of titles the letter (S) has been added to indicate the titles used in the northern or Scandinavian countries and the letter (E) to indicate the Latin titles in use in other European countries.

In the U. S. P. IX the synonyms follow the titles and in a few cases are inclosed in quotation marks. These latter names, while not scientifically correct, are so largely used in commerce that it seemed wise to include them. It is understood that a synonym appearing under the title of the drug applies with equal force to the official preparations made from that drug.

Many of the official products and mixtures are identical with or closely related to products marketed under trade names which are more or less restricted in their use. An effort has been made to include in the appended compilation all of the more widely used trade names for definite products that should be made to comply with the official requirements for purity and strength.

5. PURITY AND STRENGTH OF PHARMACOPŒIAL ARTICLES.

We recommend that the committee be instructed to revise as carefully as possible the limits of purity and strength of the pharmacopœial chemicals and preparations for which limiting tests are or may be given. While no concession should be made toward a diminution of medicinal value, allowance should be made for unavoidable, innocuous impurities or variations due to the particular source or mode of preparation, or to the keeping qualities of the several articles.

The purity rubric, which limits the percentage of innocuous impurities, as introduced into the eighth revision, should be continued, and tests and requirements should be appended to each article carrying a purity rubric.

In the case of crude drugs and natural products, the limits of admissible impurities should be placed at such a figure as to exclude any that would not be accepted by other countries.

The purity rubric which was introduced in connection with the U. S. P. VIII for chemical substances has been extended and is now made to apply equally to botanical drugs and to many of the pharmaceutical preparations. In connection with crude drugs the limits of admissible impurities as well as the limitations of ash content have been generally included. In the present Pharmacopœia it has been deemed advisable in some instances to round off decimal figures which are only given for information, as these would otherwise require the extension of decimals to an inconvenient length. For this reason there may be instances, in connection with the articles on chemical substances in which there is some slight difference between requirements of the purity rubric and the statement at the end of the volumetric assay, but the figures given in the rubric are in each case to be construed as defining the standards adopted for the article.

The introductory notice to the U. S. P. IX includes the following statement:

Standards of purity and strength prescribed in the text of this Pharmacopœia are intended solely to apply to substances which are used for medicinal preparations or in determining the identity or purity of such substances.

A change has been made in the method of stating the quantities to be taken for some of the tests and assays. A convenient quantity is to be taken, the word "about" being used to show that this need not be a definite quantity; this approximate quantity is then weighed and the result of the test or assay based upon the accurate weight.

The words "absence of" and "limit of" are no longer used in the Pharmacopœia, but a few exceptions may be found in connection with such words as "chloride," "sulphate," and "free alkali."

From the point of view of the medical practitioner changes in strength of galenical preparations require careful consideration. The more important of these changes in the U. S. P. IX are evidenced in connection with opium and its preparation. The maximum morphine content of powdered opium has been reduced from not more than 12.5 per cent of crystallized morphine to not more than 10.5 per cent of anhydrous morphine, and the strength of liquid preparations of opium has been decreased accordingly. This change was made primarily to comply with the requirements of the Brussels Conference protocol. Physicians and others interested in the enforcement of antinarcotic laws will no doubt regret that the Committee of Revision did not see fit to increase the opium strength of camphorated tincture of opium or paregoric so as to make that preparation comply strictly with the requirements of the International Protocol and at the same time remove the preparation from the exemption clause (section 6) of the Harrison antinarcotic law. An unfortunate series of changes is evidenced in connection with several National Formulary preparations in which the narcotic drug content has been reduced so that the resulting preparations will come within the exemption clause of section 6 of the Harrison antinarcotic law.

6. INTERNATIONAL STANDARDS.

The International Conference for the Unification of Formulas for Potent Remedies performed a signal service for all countries by recommending the various pharmacopœias of the world to adopt certain standards for potent medicines. It is recommended that the next Committee of Revision adopt these standards, but it is believed that it would be unwise to require the acceptance of the details of pharmaceutical or other processes recommended by the international conference.

If the finished product conforms to the international standards we believe that each country should be left free to adopt such detail and manipulation as may seem best. Nothing should prevent, however, the adoption of the recommendations of the conference as to details, if in the opinion of the next Committee of Revision, by so doing, the Pharmacopœia can be improved.

A number of minor changes have been made in the standards for drugs and preparations so as to bring these several articles into stricter compliance with the requirements of the International Protocol. The general compliance of the now official articles with the requirements of the Brussels Conference Protocol, 1902, and the resulting international treaty of 1906 is well shown by the accompanying list of the drugs and preparations included in the U. S. P. IX, and the N. F. IV compared with the requirements of the International Protocol. A table showing the compliance of pharmacopœial requirements of the official drugs and preparations with the requirements of the International Protocol has also been included in the prefatory pages of the Pharmacopœia.

A comparison of the titles and requirements included in the international protocol with the titles and requirements of the U. S. P. IX and the N. F. IV.

INTERNATIONAL PROTOCOL.

Aconitum Napellus, L.
Aconiti tuber seu Tuber "Aconiti."
 Use only the tuber of the current year, dried. Powdered drug to be used entire, without separation of residue.
Aconiti tinctura seu Tinctura Aconiti.
 Prepare by percolation with alcohol (70 per cent by volume).
 Tincture to be standardized to 0.05 per cent of total alkaloids.
Atropa Belladonna, L.
Belladonnæ folium seu Folium Belladonnæ.
 Use only the leaf dried. Powdered drug to be used entire.
Belladonnæ tinctura seu Tinctura Belladonnæ.
 Strength 10 per cent. Prepared by percolation with alcohol (70 per cent).
Belladonnæ extractum seu Extractum Belladonnæ.
 Prepare a solid extract (containing about 10 per cent of water) by means of alcohol (70 per cent).
Colchicum autumnale, L.
Colchici semen seu Semen Colchici.
 Use only the seed.
Colchici tinctura seu Tinctura Colchici.
 Strength 10 per cent.
 Prepare by percolation with alcohol (70 per cent).
Digitalis purpurea, L.
Digitalis folium seu Folium Digitalis.
 Use the leaf of the second year. Powdered drug to be used entire.
Digitalis tinctura seu Tinctura Digitalis.
 Strength 10 per cent.
 Prepared by percolation with alcohol (70 per cent).
Uragoga Ipecacuanha, Baill.
Ipecacuanhæ radix seu Radix Ipecacuanhæ.
 Powder only the root bark, rejecting the woody portion. The powder should have an alkaloidal strength of 2 per cent.
Ipecacuanhæ tinctura seu Tinctura Ipecacuanhæ.
 Strength 10 per cent.
 Prepare by percolation with alcohol (70 per cent).
Ipecacuanhæ sirupus seu Sirupus Ipecacuanhæ.
 Prepare with 10 per cent of the tincture.
Hyoscyamus niger, L.
Hyoscyami folium seu Folium Hyoscyami.
 Use only the leaf.
Hyoscyami tinctura seu Tinctura Hyoscyami.
 Strength 10 per cent.
 Prepare by percolation with alcohol (70 per cent).

U. S. P. IX OR N. F. IV.

Aconitum, U. S. P.
 Assayed: 0.5 per cent, ether soluble alkaloids. See also biological test. (Tuber of the current year not required.)
Tinctura Aconiti, U. S. P.
 10 w/v per cent, alcohol 70 per cent.
 Contains 0.045 to 0.055 w/v per cent of ether soluble alkaloids. (See also biological test.)
Belladonna Folia, U. S. P.
 Assayed: 0.3 per cent total alkaloids. (Root also recognized.)
Tinctura Belladonnæ Foliorum, U. S. P.
 10 w/v per cent. Contains from 0.027 to 0.033 w/v per cent of mydriatic alkaloids. Alcohol 50 per cent.
Extractum Belladonnæ Foliorum, U. S. P.
 Pillular: 75 per cent alcohol. Powdered: 95 per cent alcohol. Contains from 1.18 to 1.33 per cent of mydriatic alkaloids.
Colchici Cormus, U. S. P. and Colchici Semen, U. S. P. (Both Seed and Corn are official.)
Tinctura Colchici Seminis, U. S. P.
 10 w/v per cent. Contains from 0.036 to 0.044 w/v per cent of colchicine. Alcohol 60 per cent.
Digitalis, U. S. P.
 Assayed biologically. Leaf of second year not required.
Tinctura Digitalis, U. S. P.
 10 w/v per cent. Alcohol 75 per cent. Assayed biologically.
Ipecacuanha, U. S. P. (Rio or Cartagena).
 The whole drug to contain 1.75 w/v per cent of the ether-soluble alkaloids.
 Not official.
Syrupus Ipecacuanhæ, U. S. P.
 Seven times stronger than the International Protocol preparation.
Hyoscyamus, U. S. P.
 Contains not less than 0.065 w/v per cent of the alkaloids. Leaves and flowering or fruiting tops.
Tinctura Hyoscyami, U. S. P.
 10 w/v per cent. Contains from 0.0055 to 0.0075 w/v per cent of mydriatic alkaloids.

A comparison of the titles and requirements included in the international protocol with the titles and requirements of the U. S. P. IX and the N. F. IV—Continued.

INTERNATIONAL PROTOCOL—continued.

Hyoscyami extractum seu **Extractum Hyoscyami**.
Prepare a solid extract (containing about 10 per cent of water) by means of alcohol (75 per cent).

Strychnos Nux Vomica, L.
Strychni semen seu **Semen Strychni** seu **Nux Vomica**.

Alkaloidal strength (of powdered drug) 2.5 per cent.

Strychni tinctura seu **Tinctura Strychni**; **Nucis Vomice tinctura** seu **Tinctura Nucis Vomice**.
Strength 10 per cent.

Prepare by percolation with alcohol (70 per cent).

Alkaloidal strength 0.25 per cent.

Strychni extractum seu **Extractum Strychni**; **Nucis vomice extractum** seu **Extractum Nucis vomice**.
Prepare by means of alcohol (70 per cent).
Alkaloidal strength 16 per cent.

Opil pulvis seu **Pulvis opil**.

Powder to be dried at 60° C.

Strength in morphine 10 per cent.

Opil extractum seu **Extractum Opil**.
Strength in morphine 20 per cent.

Opil tinctura seu **Tinctura Opil**.

Strength 10 per cent.

Prepare by percolation with alcohol (70 per cent).

Strength in morphine 1 per cent.

Opil tinctura crocata seu **Tinctura Opilcrocata** seu **Laudanum Sydenhami**.

Strength in morphine 1 per cent.

Opil et Ipecacuanhe pulvis compositus seu **Pulvis Doveri**.

To contain 10 per cent of **Pulvis Opil**.

Opil tinctura benzoica seu **Tinctura Opil Benzolica**.
Strength in morphine 0.05 per cent.

Strophanthi tinctura seu **Tinctura Strophanthi**.

Strength 10 per cent.

Prepare by percolation with alcohol (70 per cent).

Seeds not to be freed from fat.

Sclerotium claviceptis purpure Tul. seu **Claviceptis purpure Tul.** **Sclerotium**.

Secale cornutum seu **Ergotum Secale**.

Ergot to be not more than one year old, and kept whole.

Secalis cornuti extractum seu **Extractum Secalis Cornuti**; **Ergoti extractum** seu **Extractum Ergoti**.

Prepare a watery extract and make up with alcohol (60 per cent).

Secalis cornuti extractum fluidum seu **Extractum fluidum Secalis cornuti**; **Ergoti extractum fluidum** seu **Extractum fluidum Ergoti**.

Strength 100 per cent.

Acidum hydrocyanicum dilutum.

Strength 2 per cent.

Laurocerasi aqua seu **Aqua Laurocerasi**.

Strength 0.10 per cent.

Amygdale amare aqua seu **Aqua Amygdale amare**.

Strength 0.10 per cent.

Phenoli solutio seu **Aqua phenolata**.

Strength 2 per cent.

Arsenas sodii seu **Sodii arsenas**; **Arsenicicum natrium** seu **Natrium arsenicum**.

The crystallized salt, containing 36.85 per cent of arsenic acid.

Arsenicalis liquor Fowleri seu **Liquor arsenicalis Fowleri** seu **Kalli arsenicosi liquor**.

Strength in arsenious acid 1 per cent

U. S. P. IX OR N. F. IV—continued.

Extractum Hyoscyami, U. S. P.

Made with 75 per cent of alcohol. Contains from 0.215 to 0.288 per cent of alkaloids.

Nux vomica, U. S. P.

Contains 2.5 per cent of the alkaloids.

Tinctura Nucis Vomice, U. S. P.

10 w/v per cent. Alcohol 75 per cent. Contains from 0.237 to 0.263 w/v per cent of the alkaloids.

Extractus Nucis Vomice, U. S. P.

Powdered extract made with 75 per cent alcohol. Contains from 15.2 to 16.8 per cent of the alkaloids.

Opil Pulvis, U. S. P.

Assayed: Powdered Opium 10 to 10.5 per cent of anhydrous morphine.

Extractum Opil, U. S. P.

Assayed: 19.5 to 20.5 per cent of anhydrous morphine.

Tinctura Opil, U. S. P.

10 w/v per cent. Alcohol 50 per cent. Contains from 0.95 to 1.05 w/v per cent of anhydrous morphine.

Tinctura Opil Crocata, N. F.

Contains from 0.95 to 1.05 w/v per cent of anhydrous morphine.

Pulvis Ipecacuanhe et Opil, U. S. P.

Ipecac 10, powdered opium 10, sugar of milk 80.

Tinctura Opil Camphorata, U. S. P.

0.4 w/v per cent of powdered opium.

Tinctura Strophanthi, U. S. P.

10 w/v per cent. Alcohol 95 per cent. Assayed biologically. Purified benzoin used to extract fixed oil.

Ergota, U. S. P.

Must be dried before storing.

Extractum Ergotæ, U. S. P.

Alcohol 85, water 15, HCl 1. Purified benzoin used to extract fixed oil.

Extractum Ergotæ Aquosum, N. F.

A watery extract.

Fluidextractum Ergotæ, U. S. P.

100 w/v per cent. Diluted alcohol, with 2 per cent HCl.

Acidum Hydrocyanicum Dilutum, U. S. P.

Strength: 1.9 to 2.1 per cent of HCN with not more than 0.1 per cent of HCl.

Not official.

Aqua Amygdale Amare, U. S. P.

Contains a mere trace of hydrocyanic acid.

Aqua Phenolata, N. F.

A mixture of liquified phenol with distilled water, represents approximately 2 per cent of phenol.

Sodii Arsenas, U. S. P.

Contains 58.96 to 61.92 per cent anhydrous sodium arsenate.

Liquor Potassii Arsenitis, U. S. P.

Contains potassium arsenite corresponding in amount to not less than 0.975 nor more than 1.025 per cent of arsenic trioxide.

A comparison of the titles and requirements included in the international protocol with the titles and requirements of the U. S. P. IX and the N. F. IV—Continued.

INTERNATIONAL PROTOCOL—continued.

Ferri Iodidi sirupus seu Sirupus Iodeti ferrosi seu Sirupus ferri, iodati.
Strength in anhydrous ferrous iodide 5 per cent.
Cantharidis tinctura seu Tinctura Cantharidis.
Strength 10 per cent.
Prepare by percolation with alcohol (70 per cent).
Iodi tinctura seu Tinctura iodi.
Strength 10 per cent.
Prepare with alcohol (95 per cent).
Lobeliæ tinctura seu Tinctura Lobeliæ.
Strength 10 per cent.
Prepare by percolation with alcohol (70 per cent).
Cocainum hydrochloricum.
The anhydrous salt.
Hydrargyri unguentum seu Unguentum Hydrargyri.
Strength 30 per cent.
Antimonialia vinum seu Vinum antimonialia;
Stibiatum vinum seu Vinum stibiatum.
Strength in tartar emetic 0.4 per cent.

U. S. P. IX OR N. F. IV—continued.

Syrupus Ferri Iodidi, U. S. P.
Contains 4.75 to 5.25 per cent of ferrous iodide.
Tinctura Cantharidis, U. S. P.
10 w/v per cent. Made with alcohol.
Tinctura Iodi, U. S. P.
Iodine 7 w/v per cent, potassium iodide 5 w/v per cent. Alcohol 90 per cent.
Tinctura Lobeliæ, U. S. P.
10 w/v per cent. Alcohol 50 per cent.
Cocainæ Hydrochloridum, U. S. P.
Same as International Protocol; melts between 183° and 191° C.
Unguentum Hydrargyri, U. S. P.
50 per cent (Unguentum Hydrargyri Dilutum, U. S. P. contains about 30 per cent of mercury).
Vinum Antimonii, N. F.
0.4 w/v per cent of antimony and potassium tartrate.

Table showing total number of compliances and noncompliances with the requirements of the International Protocol.

Pharmacopœias.	1902			1916		
	Com- plied.	Did not comply.	Total.	Com- plied.	Did not comply.	Total.
U. S. P.	4	16	20	20	8	28
Ph. Brit.	3	17	20	24	2	26
Ph. Germ.	17	1	18	17	1	18
Ph. Hung.	8	6	14	16	2	18
Ph. Ital.	10	5	15	19	0	19
Ph. Fr.	3	17	20	17	2	19
Ph. Svec.	12	4	16	15	0	15
Ph. Helv.	17	3	20	20	0	20
Ph. Dan.	9	3	12	14	0	14
Ph. Austr.	13	5	18	18	0	18
Ph. Belg.	2	17	19	22	0	22
Ph. Ndl.	17	4	21	21	1	22
Ph. Hesp.	1	14	15	20	0	20
Ph. Japon.	11	3	14	17	1	18
Ph. Mex.	2	16	18	15	3	18

Altogether it may be said that the requirements of the international treaty signed at Brussels in 1906 are much more closely adhered to in the present edition of the Pharmacopœia than they were in the U. S. P. VIII. The appended tables reproduced from material published in the several volumes of the Digest of Comments serve to illustrate the progress that has been made during the decade that has elapsed since the signing of the international treaty, and clearly reflect the present status of work for international uniformity. These tables also serve to suggest the possibilities of further progress along these lines.

Table showing preparations in various national Pharmacopœias in 1902 compared with proposed international standards.

	U. S. P. VII, 1893.	Ph. Brit. 1898.	Ph. Fr. IV, 1894.	Ph. Germ. IV 1900, and Suppl. 1895.	Ph. Austr. VII, 1899.	Ph. Hung. II, 1888.	Ph. Ital. II, 1901.	Ph. Ndl. III, 1889.	Ph. Belg. II, 1886.	Ph. Holv. III, 1893.	Ph. Dan. VI, 1903.	Ph. Swec. VII, 1879.	Ph. Hesp. VI, 1884.	Ph. Japon. II, 1891.	Ph. Mex. III, 1894.	Prot. Internat. 1902.
Tincture of acornle.	35 w/v	5 w/v	20	10	10	20	10	10	20	10	10	10	20	10	20	10
Tincture of belladonna.	15 w/v	1.2 w/v	20	10	10	20	10	10	20	10	10	10	20	10	20	10
Tincture of cantharides.	5 w/v	1.2 w/v	20	10	10	20	10	10	20	10	10	10	20	10	20	10
Tincture of calchicum seed.	15 w/v	20 w/v	20	10	10	20	10	10	20	10	10	10	20	10	20	10
Tincture of digitalis.	15 w/v	12.5 w/v	20	10	10	20	10	10	20	10	10	10	20	10	20	10
Tincture of hyoscyamus.	15 w/v	10 w/v	20	10	10	20	10	10	20	10	10	10	20	10	20	10
Tincture of iodine.	7 w/v	2.5 w/v	7	10	6	10	8	8	8	8	6	5	6	8.4	8.4	10
Tincture of ipecac.	20 w/v	20 w/v	20	10	10	20	10	10	20	10	10	10	20	10	20	10
Tincture of lobelia.	12 w/v	16.6 w/v	20	10	10	20	10	10	20	10	10	10	20	10	20	10
Tincture of nux vomica.	13 w/v	7.5 w/v	15	10	10	10	10	10	8.4	10	10	10	20	10	20	10
Tincture of opium.	10 w/v	10 w/v	10	10	10	10	10	10	13.5	10	10	10	8	10	12.5	10
Tincture of opium, Sydenham's.	0.5 w/v	0.46 w/v	0.45	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Tincture of opium, camphorated.	5 w/v	25 w/v	20	10	5	10	5	5	0.5	10	0.5	1.3	0.83	0.5	20	10
Bitter almond water.	7 w/v	7.3 w/v	0.5	0.1	0.1	0.1	0.1	0.1	0.05	0.1	0.1	1.3	0.83	0.1	20	10
Syrup of ipecac.	2	2	1	5	5.5	12.2	0.61	5	0.5	1	10	10	0.67	5	1	1
Hydrocyanic acid, dilute.	48.5	48.5	50	33	30	30	50	25	2.5	34	20	20	10	33	50	30
Opiment of mercury.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Solution of potassium arsenite.	0.4	0.457	1	0.4	0.4	0.4	0.4	0.4	0.5	0.4	1	0.4	0.4	0.4	0.3	0.4
Wine of antimony.	13	10	10	10	14.3	10	14.3	10	16	10	10	10	8.8	10	10	10
Powder of ipecac and opium.																

Table showing comparative degree of compliance with international standards by the several Pharmacopœias in 1916.

	U. S. P. IX, 1916.	Ph. Brit. V, 1914.	Ph. Fr. V, 1908.	Ph. Germ. V, 1910.	Ph. Austr. VIII, 1906.	Ph. Hung. III, 1909.	Ph. Ital. III, 1909.	Ph. Ndl. IV, 1906.	Ph. Belg. III, 1906.	Ph. Helv. IV, 1907.	Ph. Dan. VII, 1907.	Ph. Svec. IX, 1908.	Ph. Hosp. VII, 1908.	Ph. Japon. III, 1908.	Ph. Mex. IV, 1904.	Prot. Internat., 1902.
Tincture of aconite.....	10 w/v	10 w/v	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Tincture of belladonna.....	10 w/v	10 w/v	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Tincture of cantharides.....	10 w/v	10 w/v	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Tincture of colchicum seed.....	10 w/v	10 w/v	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Tincture of digitalis.....	10 w/v	10 w/v	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Tincture of hyoscyamus.....	10 w/v	10 w/v	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Tincture of hyoscyamus.....	7 w/v	10 w/v	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Tincture of iodine.....	10 w/v	10 w/v	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Tincture of ipecac.....	10 w/v	10 w/v	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Tincture of lobelia.....	10 w/v	10 w/v	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Tincture of nux vomica.....	10 w/v	10 w/v	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Tincture of opium.....	10 w/v	10 w/v	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Tincture of opium, Sydenham's.....	10 w/v	10 w/v	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Tincture of opium, camphorated.....	10 w/v	10 w/v	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Tincture of straphanthus.....	10 w/v	10 w/v	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Bitter almond water.....	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Syrup of ipecac.....	7 w/v	10 w/v	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Syrup of iron iodide.....	4.75-5.1	4.9-5.1	1 Ext.	0.1	0.1	0.1	0.1	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Hydrocyanic acid, dilute.....	1.0-2.1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Ointment of mercury.....	50	30	50	33	30	30	30	30	30	30	30	30	30	30	30	30
Solution of potassium arsenite.....	0.975-1.025	1 w/v	1	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Wine of antimony.....	10	10 w/v	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Powder of ipecac and opium.....	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

Table showing comparative strength of preparations of potent medicaments included in the Brussels Conference protocol and in the several pharmacopœias referred to most commonly in the United States.

	P. I. 1902.	U. S. P. IX, 1916.	Ph. Brit. V, 1914.	Ph. Germ. V, 1910.	Ph. Fr. V, 1908.	Ph. Mex. IV, 1904.
<i>Aconitum napellus</i> (L.):						
<i>Tinctura aconiti</i> —						
Strength.....	10	10 w/v	10 w/v	10	10	10
Menstruum.....	A70	A70	A70	A70	A70	A70
<i>Atropa belladonna</i> (L.):						
<i>Tinctura belladonnæ</i> —						
Strength.....	10	10 w/v	10 w/v	.....	10	10
Menstruum.....	A70	A50	A70	.....	A70	A70
<i>Extractum belladonnæ</i> —						
Menstruum.....	A70	A75	A70	A70	A70	A60
<i>Colchicum autumnale</i> (L.):						
<i>Tinctura colchici</i> —						
Strength.....	10	10 w/v	10 w/v	10	10	10
Menstruum.....	A70	A60	A70	A70	A70	A70
<i>Digitalis purpurea</i> (L.):						
<i>Tinctura digitalis</i> —						
Strength.....	10	10 w/v	10 w/v	10	10	10
Menstruum.....	A70	A75	A70	A70	A70	A70
<i>Uragoga ipecacuanhæ</i> (Baill):						
<i>Tinctura ipecacuanhæ</i> —						
Strength.....	10	.....	.....	10	10	10
Menstruum.....	A70	.....	.....	A70	A70	A70
<i>Syrupus ipecacuanhæ</i> —						
Strength.....	1	7 w/v	.....	1	1 Ext.	1
<i>Hyoscyamus niger</i> (L.):						
<i>Tinctura hyoscyami</i> —						
Strength.....	10	10 w/v	10 w/v	.....	10	10
Menstruum.....	A70	A50	A70	.....	A70	A70
<i>Extractum hyoscyami</i> —						
Menstruum.....	A70	A75	A70	.....	A70	A60
<i>Strychnos nux vomica</i> (L.):						
<i>Tinctura nucis vomicæ</i> —						
Strength.....	10	10 w/v	10	10	10	10
Menstruum.....	A70	A75	A70	A70	A70	A70
<i>Extractum nucis vomicæ</i> —						
Menstruum.....	A70	A75	A70	A70	A70	A80
<i>Opium</i> :						
<i>Opil pulvis</i> —						
Requirement.....	10	10-10.5	.....	10	10	10
<i>Extractum opil</i> —						
Requirement.....	20	20	20	20	20	20
<i>Tinctura opil</i> —						
Strength.....	10	10 w/v	10 w/v	10	10	10
Menstruum.....	A70	A50	A50	A35	A70	A70
<i>Tinctura opil crocata</i> —						
Strength.....	10	.....	.....	10	.....	10
Menstruum.....	.....	.....	.....	A35	.....	A30
<i>Pulvis ipecacuanhæ et opil</i> —						
Requirement.....	10	10	10	10	10	10
<i>Tinctura opil camphorata</i> —						
Requirement.....	0.5	0.4	0.5	0.5	0.5	0.5
<i>Tinctura strophanthi</i> —						
Strength.....	10	10 w/v	10 w/v	10	10	10
Menstruum.....	A70	A95	A70	A70	A70	A70
<i>Sclerotium claviceps purpurea</i> (Tul.):						
<i>Extractum ergotæ</i> —						
Menstruum.....	W	A85+	W+	W+	W+	W+
<i>Fluidextractum ergotæ</i> —						
Strength.....	100	100 w/v	100 w/v	100	100	100
Menstruum.....	.....	A50+	W+	A20	W+	A60
<i>Acidum hydrocyanicum dilutum</i> :						
Requirement.....	2	1.9-2.1	2	.....	2	1
<i>Aqua amygdalæ amare</i> :						
Requirement.....	0.10	0 ?	.....	0.1	.....	.....
<i>Aqua laurocerasi</i> :						
Requirement.....	0.10	.....	0.1	.....	0.1	.....
<i>Aqua phenolata</i> :						
Requirement.....	2	.....	.....	.....	2	.....
<i>Sodii arsenas</i> :						
Requirement.....	Cryst.	Cryst.	Anhydr.	.....	Cryst.	Cryst.
<i>Liquor potassii arsenitis</i> :						
Requirement.....	1	0.975-1.025	1 w/v	1	1	1
<i>Syrupus ferri iodidi</i> :						
Requirement.....	5	4.75-5.25	4.9-5.1	5	.....	1
<i>Tinctura cantharidis</i> :						
Strength.....	10	10 w/v	1.5 ?	10	10	10
Menstruum.....	A70	A	A90	A90	A70	A70

Table showing comparative strength of preparations of potent medicaments included in the Brussels Conference protocol and in the several pharmacopœias referred to most commonly in the United States—Continued.

	P. I. 1902.	U. S. P. IX, 1916.	Ph. Brit. V, 1914.	Ph. Germ. V, 1910.	Ph. Fr. V, 1908.	Ph. Mex. IV, 1904.
Tinctura Iodi:						
Strength.....	10	7 w/v	10 w/v	10	10	10
Menstruum.....	A95	A95	A80+	A90	A95	A95
Tinctura lobellæ:						
Strength.....	10	10 w/v	.....	10	10	10
Menstruum.....	A70	A50	.....	A70	A70	A70
Cocaine hydrochloridum:						
Requirement.....	Anh.	Anh.	Anh.	Anh.	Anh.	Anh.
Unguentum hydrargyri:						
Strength.....	30	50	30	33	50	30
Vinum antimonii:						
Strength.....	0.4	.....	0.4 w/v	0.4	.....	0.3

From a review of what has been accomplished, it is quite evident that in connection with the large and steadily growing class of articles that go to make up the common or universal stock of medicines we might well manifest a due and proper consideration for the usages in other countries.

In connection with the more potent articles of this class, it would appear to be particularly desirable that we endeavor to adjust our titles, descriptions, and requirements in such a way that they will comply as nearly as possible with the descriptions and requirements for similar articles in other pharmacopœias.

7. GENERAL FORMULAS.

It is recommended that general formulas be introduced as far as the particular nature of the several drugs will permit, for fluid extracts, tinctures, and such other preparations as are made by identical processes, and that the general formula to be followed in each case be merely indicated by reference.

The term general formulas is used to define a plan to save space and avoid repetition by printing typical formulas for each class of galenical preparations.

The number of general formulas in both the Pharmacopœia and in the National Formulary has been materially increased and the methods and processes for making the several official preparations have thereby been correlated and much simplified.

8. APPENDING A LIST OF PREPARATIONS IN WHICH AN OFFICIAL ARTICLE IS USED.

It is recommended that, especially for the convenience of practicing physicians, there should be appended after each article in the text a list of the official preparations in which it is used.

A few exceptions may be made to this in such cases as water, alcohol, glycerin, sugar, etc.

The list of preparations for which a given drug is used which constituted so popular a feature of the earlier editions of the Pharma-

copœia and which was omitted from the U. S. P. VIII is again included in the U. S. P. IX and will no doubt be correspondingly appreciated.

The enumeration of the official preparations containing a drug is primarily a convenience to the physician who desires to select the most suitable form of preparation for any particular use. The lists published in the Pharmacopœia are designed to include only preparations of therapeutically useful drugs, and in the case of compound preparations flavoring ingredients, correctives, and solvents have been omitted as they would occupy a large amount of space and be of only slight value to the physician or the pharmacist.

For general information, an effort has been made, in connection with the appended compilation of official articles, to include a list of the National Formulary preparations in which the several articles are used. This list should prove of interest not alone as an indication of the relative importance of the several official articles, but also as a suggestion for further restricting the number of preparations of any one drug.

9. ALCOHOLIC PERCENTAGE IN OFFICIAL PREPARATIONS.

It is recommended that a range of volume content, of absolute alcohol, be stated in the Pharmacopœia, for each preparation containing alcohol.

Because of the variation in the alcohol content of pharmaceutical preparations due to manipulation and to the variability in the water and extractive content of the drug used in making extractive preparations it was found impracticable to comply fully with the recommendations of the convention to include in the Pharmacopœia a reasonable range of the volume content of absolute alcohol for preparations containing alcohol. An effort has been made, however, to comply with the intent of the recommendation and a general method for determining the alcohol content of official preparations has been included in Part II of the Pharmacopœia followed by a table showing the average alcohol content of a number of preparations.

This list includes aromatic sulphuric acid, the two official elixirs, 3 liniments, 1 mixture, 15 spirits, and 53 tinctures.

10. ASSAY PROCESSES.

We recommend that the committee be instructed to introduce assay processes for as many of the potent drugs and preparations made therefrom as may be found practicable, provided that the processes of assay are reasonably simple (both as to methods and apparatus required) and lead to fairly uniform results in different hands. As regards the products of such assays, tests of identity and purity should be added wherever feasible.

It is recommended that biological tests or assays, when accurate and reliable, may be admitted.

The number of proximate assay processes has been materially increased and the Subcommittee on Methods of Assay has devoted a

considerable amount of time and work to the development of new processes that, it is thought, will give fairly uniform results in the hands of different operators. Many of the processes involve comparatively new principles and it remains to be seen whether the expectations of the committee will be realized.

In connection with a number of drugs for which no reliable chemical tests or assays are available optional biological assay methods have been included in Part II of the Pharmacopœia. The biological assay for cannabis and its preparations is a requirement. These biological tests, with the one exception noted, are not obligatory and the practical result of their inclusion will be watched by Pharmacopœia revision committees in all parts of the world.

In the chemical tests of the Pharmacopœia an extension has been made of the plan adopted in the previous Pharmacopœia for arsenic and heavy metals. The further elaboration of this plan saves space by avoiding the continuous repetition of detail in the text of Part I. The more frequently referred to tests are now included in Part II. In some cases the allowable percentage of moisture in the chemicals is specified in the text under the articles; when not so specified 5 per cent of moisture is permitted provided the chemical is dispensed in a condition of sensible dryness. In the case of chemical tests for innocuous impurities (chlorides, sulphates and others) it is understood that 5 minutes should be allowed to observe the reaction except where the time is specified in the tests.

In connection with practically all chemicals and preparations of chemicals for which a purity rubric has been included, a method of assay has been appended.

Two metals, mercury and zinc with their salts, are assayed by electrolysis. A chemical assay is also provided and the electrolytic method is given as an alternative. A special chapter on the subject has been included in Part II.

In commenting on the language of the chemical tests, the preface says:

As the Pharmacopœia is now a legal standard the subjunctive form of the previous Pharmacopœia in which nearly every test began has been changed to the imperative mood.

The term "nonweighable" in the text in connection with the statement of residual ash is intended to mean a quantity which is not more than 0.0005 gm.

The chemistry of the volatile oils has been thoroughly revised and the individual monographs much elaborated. Among the more important changes in this connection is the combination of the descriptions of oil of wintergreen, oil of birch and methyl salicylate in one monograph with the requirement that the source of the product be specifically stated.

In many instances a refractive index requirement has been added to specific gravity and optical rotation in connection with volatile oils. The addition of data regarding the refractive index is not generally accepted as being necessary or desirable. Schimmel & Co. (Semi-Annual Report, October, 1915, p. 44), in commenting on the inclusion of similar requirements in the British Pharmacopœia, say:

One innovation we can not approve of is the inclusion of the refractive index. Several years ago * * * we stated that we did not consider it advisable to embody such a constant in a Pharmacopœia, seeing that its limits of value have not by any means been laid down with the required degree of accuracy and seeing also that for the individual oil this value is almost without exception less characteristic than any of the other constants. Our opinion has not altered since then. The figures indicated can only be looked upon as approximate and the limits of value can not be considered reliable.

The determination of physical constants of oils and related products also includes the determination of the melting point, boiling point, and congealing point. Tests which are frequently duplicated are grouped together in Part II under the heading "General tests" in order to save space. The enumeration and description of "Reagents," "Test solutions," and "Volumetric solutions" occupies 56 pages. The list includes a total of 287 reagents, test solutions, volumetric solutions and indicators. The enumeration of the general tests and methods occupies 15 pages and includes methods for the determination of arsenic and the more commonly occurring contaminations, also methods for the determination of ash or nonvolatile matter, the determination of the chemical constants of fats and waxes, the determination of extract content, and the determination of alcohol in official preparations.

In the list of official substances used as reagents, Latin names are not used as titles, the English names being preferred.

11. SERUMS AND OTHER BIOLOGICAL PRODUCTS.

It is recommended that serums and other biological products, of approved usefulness, if standardized by the Government or one of the departments, may be admitted to the next revision of the Pharmacopœia.

The new additions in the way of biological products are not as numerous as might have been anticipated five years ago. They include 1 serum, 1 vaccine virus, and 1 gland product.

There has been a greater increase, however, in the number of titles. The sera, vaccines and gland products now official, include Antidiphtheric Serum, Purified Antidiphtheric Serum, Dried Antidiphtheric Serum, Antitetanic Serum, Purified Antitetanic Serum, Dried Antitetanic Serum, Vaccine Virus, Dried Suprarenals, Dried Thyroids, Desiccated Hypophysis and Solution of Hypophysis. The formerly official purified oxgall is now replaced by a powdered extract of oxgall.

12. WEIGHTS AND MEASURES.

It is recommended that the committee be instructed to retain the metric system of weights and measures as adopted in the eighth decennial revision.

The metric system of weights and measures has been closely adhered to and the only important changes evidenced in the U. S. P. IX are the use of the word "millilitre" and the abbreviated designation "mil" or plural "mils" in place of the somewhat more cumbersome cubic centimetre or c. c. of former revisions.

Formulas are given only in the metric system of weights and measures. Fluids are usually directed to be measured while solids are weighed. Doses as in the previous edition are given alternately in the metric and the apothecaries' system of weights and measures.

The Committee of Revision, following the precedent established by the British Pharmacopœia, adopted the term mil as the official designation for millilitre or the one-thousandth part of a litre in place of the more cumbersome cubic centimetre or c. c., generally used heretofore. The word mil, which was officially recognized by the British Board of Trade (May 1, 1908), displaces cubic centimetre in the recent edition of the British Pharmacopœia and can therefore be used in prescribing throughout the British Empire.

The word mil and fractions thereof as decimil and centimil appeared originally in the first edition of the British Pharmaceutical Codex, 1907, where their use was resorted to as a means of overcoming the frequently noted absence of a short euphonious designation for small quantities of liquids, which seemed likely to retard the much-to-be desired adoption of the metric system by prescribers. The committee entrusted with the compilation of the British Pharmaceutical Codex expressed the thought that the English custom of measuring liquids, which tends to accuracy and the saving of time in dispensing, requires that there be a convenient short name for metric measures of capacity and the adoption of the new term was considered as completing the metric system for use in English-speaking countries.

The inclusion of the term mil in the Pharmacopœia of the United States and in the National Formulary completes its adoption throughout the English-speaking world and will make for uniformity of practice in all countries of the world in which liquids are measured and solids weighed in the making of pharmaceutical preparations or the dispensing of prescriptions.

13. SUPPLEMENT.

It is recommended that the Committee of Revision be authorized to prepare a supplement to the Pharmacopœia at any time they may deem such action desirable.

The advantage of periodical supplements to a pharmacopœia as widely used as is the Pharmacopœia of the United States has

been evidenced by the publication of the several supplements in connection with the Netherlands Pharmacopœia. The fourth edition of this pharmacopœia was published in 1905. The first supplement published in 1910 and the second supplement published in 1914 have sufficed to keep the original publication up to date.

14. PUBLICITY.

It is recommended that the General Committee of Revision make public, for comment and criticism, an abstract of new descriptions and standards and of changes in descriptions and standards proposed, before final adoption.

In compliance with the recommendation to publish in advance the changes in descriptions and standards with the object of informing those interested in the Pharmacopœia of such proposed changes, the Committee of Revision published in 1911 a list of the proposed additions to and deletions from the Pharmacopœia of the United States. Abstracts of the proposed changes with new standards and descriptions were later published in the *Journal of the American Pharmaceutical Association* and subsequently republished in the form of pamphlets for general distribution to all who might be interested. This information was published in six installments or parts (Part I, *J. Am. Pharm. Assoc.* 1913, v. 2, p. 1376-1416; Part II, *J. Am. Pharm. Assoc.* 1914, v. 3, p. 359-416; Part II, *ibid.*, p. 524-552; Part IV, *ibid.*, p. 984-997; Part V, *ibid.*, p. 1100-1110; Part VI, *ibid.*, p. 1581-1583).

15. ATOMIC WEIGHTS.

It is recommended that the system of atomic weights, authorized by the international committee (0-16), be adopted for the next revision.

In compliance with the above suggestion the atomic weights included in the U. S. P. IX are those adopted by the International Committee on Atomic Weights in 1914 using 0-16 for the standard. The table of atomic weights in the U. S. P. IX is copied from the report of the International Committee on Atomic Weights for 1915. The report for 1916 was received too late for inclusion, as the Pharmacopœia was already in type.

A table of elements and pharmacopœial chemicals with their atomic and molecular weights has also been included in Part II of the Pharmacopœia. This table occupies 15 pages and will be found to be useful by all who are engaged in practical work. The following table of the names, symbols, and atomic weights of the elementary bodies mentioned in the Pharmacopœia and in the National Formulary is copied from the more comprehensive table printed in the Pharmacopœia. This abbreviated table should be of value in connection with the other data published in this bulletin.

Table of names, symbols, and atomic weights of the elementary bodies mentioned in the Pharmacopœia of the United States and in the National Formulary based on the table adopted by the international committee on atomic weights. (1915) O=16.

Name.	Symbol.	Atomic weight.	Name.	Symbol.	Atomic weight.
Aluminum.....	Al.....	27.1	Lithium.....	Li.....	6.94
Antimony.....	Sb.....	120.2	Magnesium.....	Mg.....	24.32
Arsenic.....	As.....	74.96	Manganese.....	Mn.....	54.93
Barium.....	Ba.....	137.37	Mercury.....	Hg.....	200.6
Bismuth.....	Bi.....	208.0	Molybdenum.....	Mo.....	96.0
Boron.....	B.....	11.0	Nitrogen.....	N.....	14.01
Bromine.....	Br.....	79.92	Oxygen.....	O.....	16.00
Cadmium.....	Cd.....	112.40	Palladium.....	Pd.....	106.7
Calcium.....	Ca.....	40.07	Phosphorus.....	P.....	31.04
Carbon.....	C.....	12.00	Platinum.....	Pt.....	195.2
Cerium.....	Ce.....	140.25	Potassium.....	K.....	39.10
Chlorine.....	Cl.....	35.46	Silicon.....	Si.....	28.3
Chromium.....	Cr.....	52.0	Silver.....	Ag.....	107.88
Cobalt.....	Co.....	58.97	Sodium.....	Na.....	23.00
Copper.....	Cu.....	63.57	Strontium.....	Sr.....	87.63
Fluorine.....	F.....	19.0	Sulphur.....	S.....	32.07
Gold.....	Au.....	197.2	Tin.....	Sn.....	119.0
Hydrogen.....	H.....	1.008	Tungsten.....	W.....	184.0
Iodine.....	I.....	126.92	Uranium.....	U.....	238.5
Iron.....	Fe.....	55.84	Zinc.....	Zn.....	65.37
Lead.....	Pb.....	207.10			

16. PHYSICAL CONSTANTS.

It is recommended that official methods for taking physical constants be inserted in the "Introductory notices," and these shall apply to all articles in which physical constants are officially used, unless otherwise specifically excepted.

The official methods for testing physical constants have been studied at length and are described in detail in Part II of the Pharmacopœia. The methods for determining melting points, and boiling points have been carefully worked out in connection with the requirements for thermometer standardization promulgated by the Bureau of Standards.

The figures given for melting points as factors in determining the identity and purity of organic chemicals have been determined according to methods which are described in detail in Part II. It is understood that where any of these factors are given with a range instead of a single figure that these are to be regarded as inclusive.

A method for determining the congealing points of liquids is also outlined. Congealing points not stated in the form of requirements are given as information and are not intended as tests of purity.

The statements concerning solubility are not intended as physical constants but as information required in connection with the preparation and dispensing of medicines. A method for the accurate determination of solubilities is outlined. Solubility is expressed by stating the number of millilitres of the solvent in which one gram of a solid or one millilitre of a liquid will remain in solution at a temperature of 25°. The solubility figures given are not intended to be construed as legal requirements, except in the case of volatile oils.

Except where otherwise stated, the specific gravity basis of the U. S. P. is 25°.

DEFINITIONS OF PHYSICAL CONSTANTS.

Melting point is defined as that interval of temperature within which the substance is observed to melt when treated in accordance with the general directions outlined in the Pharmacopœia.

Congealing point is defined as the highest temperature remaining constant for a short time during the congealing of a substance by the method outlined in the Pharmacopœia.

Boiling point is defined as that range of temperature within which at least 95 per cent, by volume, of the substance distills when treated as directed by the Pharmacopœia.

Specific gravity is defined as the weight (in air with brass weights, barometer at 760 m. m.) of a volume of the fluid equal to the same volume of the *unit* (1,000) of pure water at the same temperature. In the tables included in the Pharmacopœia figures are given both for 25°, the official standard temperature, and for 15°.

Optical rotation.—The specific rotatory power is defined as the rotatory power of an optically active liquid substance observed with sodium light and referred to the ideal density 1, and in a tube having a length of 1 decimeter (100 m. m.). Formulas for calculating the specific rotatory power of an optically active substance are appended.

Refractive index is described as the degree of deviation of a ray of light in passing from one transparent substance to another.

17. STANDARD TEMPERATURE.

It is recommended that the standard temperature of 25° C. (77° F.) be retained, as used in the present revision (except in the case of alcohol), and that a table be inserted in the appendix for corresponding figures at 15° C. (59° F.).

The standard temperature of 25° for testing physical constants has been continued; despite the fact that the U. S. P. is the only pharmacopœia in which this degree of temperature appears. The preface to the U. S. P. IX points out that this temperature has been retained in this revision because it has proved more suitable to the climate of the United States. For alcohol the former standard temperature of 60° F. has been retained since the laws and regulations of the internal revenue department of the United States are still based on this degree of temperature.

In connection with the tables of specific gravity of the more important liquid acids and of solutions of ammonia, included in Part II and based on apparent specific gravity at 25°, the corresponding figures at 15° are included with the necessary correction of specific gravity for each 1°.

18. COMPOUND PREPARATIONS.

It is recommended that the introduction of new compound preparations be discouraged as far as possible.

In compliance with the above recommendation a number of compound preparations have been deleted from the Pharmacopœia and

no new preparations of this type have been included. Practically all of the compound preparations deleted from the Pharmacopœia have been included in the National Formulary.

19. PHARMACOGNOSTICAL DESCRIPTIONS.

It is recommended that with the description of a crude drug there be included brief pharmacognostical descriptions, both macroscopic and microscopic, where practicable, and there should also be added a statement of the appearance of the structural elements in the powder when examined microscopically, as a means of detecting adulteration.

The pharmacognostical descriptions of crude drugs are given at length, and in this connection it is probable that no pharmacopœia excels or even approaches the U. S. P. in the comprehensiveness and accuracy of its descriptions. The standards provided in the text apply equally to the powdered or ground drug. For the preservation of vegetable or animal drugs from the ravages of insects it is directed in special cases that they be preserved in tightly closed containers and a few drops of chloroform or carbon tetrachloride added. This precaution is intended to aid more particularly in the preservation of drugs in the stock of the pharmacist.

20. POWDERED DRUGS.

It is recommended that in the next Pharmacopœia powdered drugs be required to represent the entire drug unless specifically stated otherwise. Where the drug can be powdered without residue this should be required; in other cases the amount of allowable tailings, gruffs, or residue should be determined and inserted in the text.

In all instances where the drug occurs in commerce in a powdered form the histological characters of the powder are described. The designation of the fineness of powders and of granular salts is based on the formerly used standard of number of meshes per linear inch of sieve through which the powder would pass. The fineness of powders, however, has been redefined in terms of the maximum diameter of the particles of the powder as measured by the width of the opening of the meshes of the sieve from which they received their designating numbers.

21. DIAGNOSTICAL REAGENTS.

It is recommended that there be included in the next Pharmacopœia such reagents, with standards for strength and purity, as are needed for the proper execution of tests that are valuable and important in the making of a correct diagnosis.

The chapter on diagnostical reagents included in Part II of the U. S. P. IX is a comprehensive one and fully in accord with the possible requirements of medical practitioners and laboratory men generally. The introduction of this chapter was warranted by the growing use of chemical reagents for clinical tests and the increasing

importance of these tests in determining the presence and nature of disease.

22. DATE WHEN THE NEXT PHARMACOPŒIA BECOMES OFFICIAL.

It is recommended that the Committee of Revision print upon the title page of the next Pharmacopœia a definite date, reasonably distant from the actual date of publication, announcing when the new Pharmacopœia is intended to go into effect and to supersede the preceding one.

The previously made criticisms of the short period of time given between the date of publication of the Pharmacopœia and the date on which it becomes official is to a considerable extent avoided by the preliminary publication of abstracts of the proposed changes in pharmaceutical journals and in the form of reprints.

23. PRECEDENTS.

In all matters not specially provided for, in these general principles the rules established for previous revisions, if there are any, should be generally followed.

In regard to the following of precedents some differences of opinion have arisen, more particularly in connection with the scope of the Pharmacopœia. This feature will be discussed freely, no doubt, in forthcoming reviews of the Pharmacopœia, to which the reader is referred.

24. SOLUBILITIES.

It is recommended that the degree of solubility of drugs in various solvents be given as extensively as possible.

In commenting on the solubility data in the introductory pages of the Pharmacopœia, it is said:

The statements concerning the solubilities are intended for information and are not intended as physical constants in the strict sense of this term. The solubility of official articles is usually given at some length and in a general article on solubilities, in Part II of the Pharmacopœia, methods are given for determining the solubility of various substances.

In connection with these directions it is pointed out that the solubility data as given in the Pharmacopœia have for the most part been determined under conditions such as are described in the directions and will therefore frequently show a somewhat higher solubility than would be found in the every-day experience of most pharmacists.

RECOMMENDATIONS TO THE COMMITTEE ON NATIONAL FORMULARY.

The Committee on National Formulary of the American Pharmaceutical Association held a conference in Hot Springs, Ark., in September, 1908, and presented a report in which the principles for revising the National Formulary were outlined (Proc. Am. Pharm. Assoc. 1908, v. 56, p. 487-506).

The following synopsis of the recommendations of this committee published in the preface to the National Formulary (fourth issue) includes practically all of the important principles indorsed by the association, to guide the committee in the revision of the National Formulary:

That the cooperation of the medical profession and the medical departments of the National Government be secured.

That the present scope of the Formulary as indicated in the preface be continued

That conservative action and liberal interpretation be given to the consideration of suitable articles for the Formulary.

That the Metric system only be used.

That the strength of liquid preparations be stated as so many grammes in 100 cubic centimeters.

That all formulas be uniform in style.

That the nomenclature, titles, and synonyms be in conformity with the United States Pharmacopœia or with modern ideas, and that the titles should be descriptive of the composition, and therapeutic or anatomical titles should be discouraged.

That suitable definitions for unofficial ingredients may be added.

That the term "Appendix" be eliminated, and the book designated as Parts I and II.

That the title of the book be the National Formulary.

That a statement be inserted in the preface to the effect that the National Formulary does not assume any responsibility for the therapeutic value of any preparation, and that the question of additions or eliminations be decided mainly on the basis of commercial demands.

That trade-mark names shall not be introduced.

That authority be given to the committee to establish a specific date on which the next edition of the National Formulary shall go into effect.

In the compilation of the present edition of the National Formulary the committee intrusted with its revision was unable to secure the active cooperation of any representative organization of medical men, though, as is pointed out in the preface to the book, individual members of the medical profession have taken a very active part in developing some of the special features of the present edition.

In compliance with a request made by the council of the American Pharmaceutical Association in 1908, the Surgeon General of the Public Health Service, with the approval of the Secretary of the Treasury, directed that the "Digest of Comments on the Pharmacopœia" should in future also include a report of Comments on the National Formulary. This cooperation has been of practical value in that it has been instrumental in bringing to the attention of members of the Committee on National Formulary suggestions and criticisms that otherwise would probably have been overlooked.

The scope of the National Formulary as in former issues is based on usage rather than therapeutic value. The total number of articles has been somewhat increased by the inclusion of standards for drugs that are not included in the Pharmacopœia. The actual number of titles in Part I of the Formulary has not been materially

changed from the total of the titles included in the N. F. III. This part includes a total of 596 titles, of which 12 are general headings or descriptions. Part II of the National Formulary includes 188 titles, of which 140 are drugs of vegetable origin, 6 drugs of animal origin, and 42 chemicals. The two parts combined contain a total of 784 titles or two more than are contained in Part I of the U. S. P. IX.

The additions to the National Formulary aggregate a total of 201 titles, including 3 cerates, 2 confections, 10 elixirs, 2 emulsions, 8 extracts, 50 fluid extracts, 5 fluid glycerates and a general formula, 2 infusions, 2 inunctions, 11 solutions, 2 honeys, 4 nebulas, 4 oleates, 2 oils, 18 petroxolins, 7 pills, 2 powders, 4 spirits, 10 syrups, 19 tinctures, 8 troches, 4 ointments, 5 wines, and 16 miscellaneous preparations.

The articles deleted from the previous issue of the National Formulary aggregate a total of 183, including 2 vinegars, 4 acids, 4 cerates, 2 decoctions, 23 elixirs, 12 plasters, 4 emulsions, 7 extracts, 12 fluid extracts, 3 liniments, 15 solutions, 3 mixtures, 3 mucilages, 3 pills, 8 powders, 9 spirits, 9 syrups, 14 tinctures, 8 troches, 3 ointments, 6 wines, and 29 miscellaneous preparations.

All of the formulas in the Formulary are now included in Part I and Part II is devoted entirely to standards for drugs and simples.

Part III of National Formulary is also an entirely novel feature. It consists of descriptions of special tests and reagents reprinted from the U. S. P. IX by special permission of the Board of Trustees of the United States Pharmacopoeial Convention.

Prominent among the additions to the Formulary are the fluid glycerates, a class of preparations thought to have some pharmaceutical advantages. They are of the same strength as fluid extracts, are made with glycerin and water as a menstruum and are usually miscible with water. The class of saponated petrolatums has been considerably extended by the inclusion of formulas for a number of solutions of active medicaments in the simple saponated petrolatum, now called petroxolin. The list of fluid extracts has been augmented by a net increase of 38, 12 having been deleted and 50 added.

The title *Unguenta Extensa* has been replaced by the shorter title "*Mulla*," though in other respects the committee has apparently found it to be impracticable to simplify any appreciable number of the longer titles. Many if not all of the formerly common therapeutic titles have been deleted and substituted by titles indicative of the composition of the preparation.

The definitions and the tests for the articles in Part II of the National Formulary have been prepared by the Committee on Standards for Unofficial Drugs and Chemicals of the American Pharmaceutical Association. This committee was appointed and began its work in 1909. Later, at the request of the Committee on National

Formulary, the council of the American Pharmaceutical Association directed the Committee on Standards to cooperate in the preparation of the needed standards for drugs and chemicals used in the National Formulary.

In compliance with the precedent established in the Pharmacopœia of the United States the weights and measures used in the formulas are of the metric system only and the word "mil," plural "mils," has been used throughout the book in place of cubic centimetre or c. c. As in the Pharmacopœia, doses are stated in both the metric system and in approximate, not exact, equivalents in the apothecaries' system of weights and measures.

The several titles of the preparations included in the Brussels Protocol and also included in the National Formulary are accompanied by the initials P. I. to indicate the practical compliance of these articles with the requirements in the Brussels Conference Protocol. Throughout the book the nomenclature and the general style of formulas and descriptions have been made to comply with the Pharmacopœia of the United States. The publication of the Formulary has been held back to some extent in order that the two books may be in full agreement and possible duplications avoided.

Because of the difficulties encountered it was found to be impracticable to state the alcoholic strength of preparations containing alcohol. This is particularly true of fluid extracts and tinctures because of the unavoidable variation in alcoholic strength of many of the preparations due to differences in the moisture content and extract content of drugs. The preface very properly states that at the present time statements of alcoholic strength of preparations are needed chiefly for interstate commerce and are rarely required by the local trade.

Following the precedent established by the U. S. P. IX, abbreviations of the National Formulary titles have been introduced as an aid to prescription writing and for concise labeling. The use of these abbreviations is recommended to avoid ambiguity. A chapter on sterilization has also been included in the National Formulary. This chapter is stated to be for reference for those who are not trained in bacteriological practice. The directions as given are to be considered as instructive and advisory and not absolute or final. As improved methods may be developed, their absence from this chapter is not to be construed as inhibiting their employment.

Altogether it may well be said that the new editions of the Pharmacopœia and the National Formulary are a distinct advance on their predecessors in that the tests for purity and strength have been much elaborated and the requirements are generally higher. The marked increase in the number of methods of assay is designed to insure the ready control of official articles by making it possible to

ascertain their relative compliance with the official requirements or rubrics.

The two books now available may very properly be claimed to be the best and most comprehensive standards for drugs so far published.

As noted above, the following compilation of titles with changes and requirements is designed specifically to serve as a guide to show the present status of the several articles included in the present and in the immediately preceding editions of the U. S. P. and the N. F.

The material presented herewith is altogether too fragmentary to serve as more than an elaborated index. For working formulas tests and the complete requirements of the Pharmacopœia and the National Formulary, the reader is referred to the books themselves.

**ALPHABETICAL LIST OF OFFICIAL LATIN TITLES, WITH
CHANGES AND REQUIREMENTS, DESIGNED TO SHOW THE
PRESENT STATUS OF THE SEVERAL ARTICLES INCLUDED
IN THE U. S. P. IX, U. S. P. VIII, N. F. IV, AND N. F. III.**

ABSINTHIUM, N. F. IV, Part II.

Absinth.

Absinthium, Wormwood, Madderwort, Vermuth. The dried leaves and flowering tops of *Artemisia Absinthium* Linné without the presence or admixture of more than 5 per cent of foreign matter. Yields not more than 10 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparation: N. F.—Vinum Aurantii Compositum.

ACACIA, U. S. P. IX.

Acac.

Acacia, Gum Arabic, Gum Senegal. Official in a number of European pharmacopœias as Gummi Arabicum. Acacia is slowly and almost completely soluble in twice its weight of water. Not more than 1 per cent of powdered acacia is insoluble in water.

Preparations: U. S. P.—Mucilago Acaciæ, Syrupus Acaciæ, Pulvis Cretæ Compositus.

N. F.—Used in making Emulsa, Misturæ, Trochisci.

ACETANILIDUM, U. S. P. IX.

Acetanil.

Acetanilid, Acetanilide, Antifebrin; also known as phenylacetamide. Official in European pharmacopœias as Antifebrinum (E). Melts between 112°–114° and leaves not more than 0.05 per cent of ash. Color test for acetphenetidin and test for readily carbonizable impurities.

Average dose: 0.2 gm. or 3 grains.

Preparation: N. F.—Pulvis Acetanilidi Compositus.

ACETONUM, U. S. P. IX.

Aceton.

Acetone, Dimethyl-ketone. Contains not less than 99 per cent by weight of C_2H_6O . The residue from 25 mls of acetone does not exceed 0.002 gm.

Preparation: U. S. P.—Collodium Cantharidatum.

ACETPHENETIDINUM, U. S. P. IX.

Acetphen.

Acetphenetidin, Phenacetin; also known as Para-acetphenetidin. The monoacetyl derivative of para-amidophenetol. Official in European pharmacopœias as Phenacetinum (E). A saturated aqueous solution is neutral to litmus. Acetphenetidin melts between 133°

and 135°. Ash does not exceed 0.05 per cent. Tests for readily carbonizable impurities and for acetanilid.

Average dose: 0.3 gm. or 5 grains.

ACETUM AROMATICUM, N. F. IV.

Acet. Arom.

Aromatic Vinegar. Now a solution of volatile oils in a mixture of alcohol (1), acetic acid (1), and water (2).

ACETUM OPII, N. F. IV, from U. S. P. VIII.

Acet. Opii

Vinegar of Opium, popularly known as Black Drop, also known as Lancaster Black Drop and Quaker Black Drop. Granulated opium 10 w/v per cent with myristica and sugar in diluted acetic acid.

Average dose: 0.5 mil. or 8 minims.

ACETUM LOBELLE, N. F. III. Deleted.

ACETUM SANGUINARIÆ, N. F. III. Deleted.

ACETUM SCILLÆ, U. S. P. IX.

Acet. Scill.

Vinegar of Squill. No change; 10 w/v per cent in diluted acetic acid.

Average dose: 1 mil or 15 minims.

Preparations: U. S. P.—Syrupus Scillæ.

N. F.—Oxymel Scillæ.

ACIDUM ACETICUM, U. S. P. IX.

Acid. Acet.

Acetic Acid. Now contains from 36 to 37 per cent of $C_2H_4O_2$. Tests for copper omitted. Method of assay.

Preparations: U. S. P.—Acidum Aceticum Dilutum (which see).

N. F.—Linimentum Terebinthinæ Aceticum. Used in making Acetæ, Syrupus Sanguinariæ.

ACIDUM ACETICUM DILUTUM, U. S. P. IX.

Acid. Acet. Dil.

Diluted Acetic Acid. Now contains from 5.7 to 6.3 per cent $C_2H_4O_2$. Tests and method of assay.

Average dose: 2 mils or 30 minims.

Preparations: U. S. P.—Acetum Scillæ (which see). Used in making: Liquor Ammonii Acetatis, Liquor Ferri et Ammonii Acetatis.

N. F.—Acetum Opii. Used in making: Liquor Strychninæ Acetatis, Mistura Adstringens, Syrupus Allii.

ACIDUM ACETICUM GLACIALE, U. S. P. IX

Acid. Acet. Glac.

Glacial Acetic Acid. Contains not less than 99 per cent of $C_2H_4O_2$. Boils between 117° and 118°. Congealing point not below 14.5°. Tests for identity and purity and a method of assay.

Preparations: N. F.—Used in making: Liquor Alumini Acetico-Tartratis, Liquor Ferri Acetatis.

ACIDUM BENZOICUM, U. S. P. IX

Acid. Benz.

Benzoic Acid. Obtained from benzoin or prepared synthetically. Contains not less than 99.5 per cent of $C_7H_6O_2$. Melts between 120°

and 122° and leaves not more than 0.05 per cent of ash. Tests and a method of assay.

Average dose: 0.5 gm. or 8 grains.

Preparation: U. S. P.—*Tinctura Opii Camphorata*.

ACIDUM BORICUM, U. S. P. IX.

Acid. Bor.

Boric Acid, Boracic Acid. Contains when dry not less than 99.5 per cent of H_3BO_3 .

Average dose: 0.5 gm. or 8 grains.

Preparations: U. S. P.—*Glyceritum Boroglycerini*, *Unguentum Acidi Borici*.

N. F.—*Kaolini*, *Liquor Antisepticus*, *Pulvis Antisepticus*, *Pulvis Talci Boro-Salicylatis*.

ACIDUM BROMAURICUM, N. F. IV, Part II.

Acid. Bromauric.

Bromauric Acid. Contains $HAuBr_4 + 5H_2O$, corresponding to not less than 32.32 per cent of metallic gold Au. Tests for identity and purity.

Average dose: 0.006 gm. or $\frac{1}{16}$ grain.

Preparation: N. F.—*Liquor Auri et Arseni Bromidi*.

ACIDUM CAMPHORICUM, U. S. P. VIII. Deleted.

ACIDUM CARBOLICUM IODATUM, N. F. III. See *Phenolum Iodatum*.

N. F. IV.

ACIDUM CITRICUM, U. S. P. IX.

Acid. Cit.

Citric Acid. Contains not less than 99.5 per cent of $C_6H_8O_7 + H_2O$. Leaves not more than 0.05 per cent of ash. Method of assay.

Average dose: 0.5 gm. or 8 grains.

Preparations: U. S. P.—*Syrupus Acidi Citrici*, *Syrupus Aurantii*. Used in making: *Liquor Magnesii Citratis*, *Liquor Potasii Citratis*, *Sales Effervescentes*.

N. F.—Used in making: *Elixir Ferri Pyrophosphatis*, *Quininæ et Strychninæ*, *Liquores* (which see), *Sales Effervescentes*.

ACIDUM CITRICUM SACCHARATUM, N. F. III. Deleted.

ACIDUM FORMICUM, N. F. IV. Part II.

Acid. Formic.

Formic Acid. An aqueous solution containing from 24 to 26 per cent of $HCOOH$. Tests for identity and purity and a method of assay.

Average dose: 0.3 mil or 5 minims.

Preparations: N. F.—*Elixir Formatum*, *Elixir Formatum Compositum*, *Spiritus Acidi Formici*.

ACIDUM GALLICUM, U. S. P. IX.

Acid. Gallic.

Gallic Acid. Leaves not more than 0.1 per cent of ash and loses not more than 12 per cent of its weight on drying at 100°. Tests for identity and purity and test for tannic acid.

Average dose: 1 gm. or 15 grains.

ACIDUM HYDRIODICUM DILUTUM, U. S. P. IX. Acid. Hydriod. Dil.
Diluted Hydriodic Acid. Contains from 9.5 to 10.5 per cent of HI.
Tests and a method of assay.

Average dose: 0.5 mil or 8 minims.

Preparation: U. S. P.—Syrupus Acidi Hydriodici.

ACIDUM HYDROBROMICUM DILUTUM, U. S. P. Acid. Hydrobrom. Dil.
Diluted Hydrobromic Acid. Contains from 9.5 to 10.5 per cent of HBr. Residue on evaporation limited; not to exceed 0.01 per cent.
Method of assay.

Average dose: 1 mil or 15 minims.

Preparation: N. F.—Elixir Calcii Bromidi.

ACIDUM HYDROCHLORICUM, U. S. P. IX. Acid. Hydrochl.
Hydrochloric Acid; formerly known as Muriatic Acid or Spirit of Salt. Official in Northern Europe as Acidum Hydrochloratum (S). Contains from 31 to 33 per cent of HCl.

Preparations: U. S. P.—Acidum Hydrochloricum Dilutum (which see), Acidum Nitrohydrochloricum, Acidum Nitrohydrochloricum Dilutum. Used in making: Liquor Ferri Chloridi, Liquor Zinci Chloridi.

N. F.—Used in making: Elixir Pepsini, Fluidextractum Cinchonæ Aquosum, Glyceritum Pepsini, Liquores (which see), Syrupus Calcii Hydrochlorophosphatis.

ACIDUM HYDROCHLORICUM DILUTUM, U. S. P. IX.

Acid. Hydrochl. Dil.
Diluted Hydrochloric Acid. Contains from 9.5 to 10.5 per cent of Hcl. Method of assay added.

Average dose: 1 mil or 15 minims.

Preparations: U. S. P.—Used in making: Extractum Ergotæ, Liquor Acidi Arsenosi.

N. F.—Used in making: Extractum Conii, Liquor Pepsini Antisepticus.

ACIDUM HYDROCYANICUM DILUTUM, U. S. P. IX.

Acid. Hydrocyan. Dil.
Diluted Hydrocyanic Acid; sometimes referred to as Prussic Acid. Included in the International Protocol as Acidum Hydrocyanicum Dilutum (P. I.). Contains from 1.9 to 2.1 per cent of HCN. Tests and method of assay.

Average dose: 0.1 mil or 1.5 minims.

ACIDUM HYPOPHOSPHOROSUM, N. F. III. Deleted.

ACIDUM HYPOPHOSPHOROSUM, U. S. P. IX. From N. F. III.

Acid. Hypophos.
Hypophosphorous Acid. Contains from 30 to 32 per cent of H_3PO_2 . Tests and method of assay.

Preparation: U. S. P.—*Acidum Hypophosphorosum Dilutum* (which see).

N. F.—Used as a preservative in a number of preparations.

ACIDUM HYPOPHOSPHOROSUM DILUTUM, U. S. P.

Acid. Hypophos. Dil.

Diluted Hypophosphorous Acid. Contains from 9.5 to 10.5 per cent of $\text{H}_3\text{P}_2\text{O}_7$. Method of assay.

Average dose: 0.5 mil or 8 minims.

Preparations: U. S. P.—Used as a preservative in *Syrupus Ferri Iodidi*, *Syrupus Hypophosphitum*.

N. F.—Used as a preservative in *Liquor Ferri Protochloridi*, *Syrupus Hypophosphitum Compositus*, *Syrupus Ammonii Hypophosphitis*.

ACIDUM LACTICUM, U. S. P. IX.

Acid. Lact.

Lactic Acid. Contains the optically inactive α -hydroxypropionic acid and lactic anhydrides, equivalent to a total of from 85 to 90 per cent of $\text{C}_3\text{H}_5\text{O}_3$. Tests for glycerin and a method of assay.

Average dose: 2 mils or 30 minims.

Preparation: U. S. P.—*Syrupus Calcii Lactophosphatis*.

N. F.—*Elixir Calcii Lactophosphatis*, *Elixir Glycerophosphatum Compositum*, *Elixir Pepsini et Rennini Compositum*, *Emulsum Olei Morrhue cum Calcii Lactophosphatis*.

ACIDUM METAPHOSPHORICUM DILUTUM, N. F. III. Deleted.

ACIDUM NITRICUM, U. S. P. IX.

Acid. Nitric.

Nitric Acid; formerly known as *Aqua Fortis*. Contains from 67 to 69 per cent of HNO_3 . Tests and a method of assay.

Preparations: U. S. P.—*Acidum Nitrohydrochloricum*, *Acidum Nitrohydrochloricum Dilutum*. Used in making: *Liquor Ferri Chloridi*, *Liquor Ferri Sulphatis*, *Liquor Ferri Tersulphatis*, *Liquor Zinci Chloridi*, *Unguentum Hydrargyri Nitratis*.

N. F.—*Mistura Camphoræ Acida*. Used in making: *Glyceritum Bismuthi*, *Liquores* (which see).

ACIDUM NITRICUM DILUTUM, U. S. P. VIII. Deleted.

ACIDUM NITROHYDROCHLORICUM, U. S. P. IX. *Acid. Nitrohydrochl.*

Nitrohydrochloric Acid, Nitromuriatic Acid; formerly known as *Aqua Regia*. Made by mixing nitric acid (18) and hydrochloric acid (82). Must contain free chlorine. Ten mils should not leave on evaporation more than 0.0035 Gm. of residue.

Average dose: 0.2 mil or 3 minims.

ACIDUM NITROHYDROCHLORICUM DILUTUM, U. S. P. IX.

Acid. Nitrohydrochl. Dil.

Diluted Nitrohydrochloric Acid, Diluted Nitromuriatic Acid. Contains hydrochloric acid, nitric acid, nitrosyl chloride and chlorine.

Made by mixing nitric acid (4), hydrochloric acid (18), and distilled water (to make 100). A requirement for free chlorine.

Average dose: 1 mil or 15 minims.

ACIDUM OLEICUM, U. S. P. IX.

Acid. Oleic.

Oleic Acid. Does not become semisolid above 9° and congeals to a whitish, solid mass at or about 4°. Ash does not exceed 0.1 per cent. Tests for mineral acids.

Preparation: U. S. P.—Oleatum Hydrargyri.

N. F.—Oleata, Petroxolina.

ACIDUM PHENYLCINCHONICUM, U. S. P. IX. New.

Acid. Phenylcinch.

Phenylcinchonic Acid, Phenyl-quinoline-carboxylic Acid; better known under the trade-name Atophan. Melts at 210° with partial decomposition. 0.5 gm. leaves no weighable residue.

Average dose: 0.5 gm. or 8 grains.

ACIDUM PHOSPHORICUM, U. S. P. IX.

Acid. Phos.

Phosphoric Acid. Contains from 85 to 88 per cent of H_3PO_4 . Tests and method of assay.

Preparations: U. S. P.—Acidum Phosphoricum Dilutum, Syrupus Calcii Lactophosphatis.

N. F.—Elixir Calcii et Sodii Glycerophosphatum, Elixir Calcii Lactophosphatis, Elixir Gentianæ Glycerinatum, Liquor Phosphatum Acidus, Liquor Phosphatum Compositus (which see), Syrupus Ferri Lactophosphatis, Syrupus Ferri, Quininæ et Strychninæ Phosphatum.

ACIDUM PHOSPHORICUM DILUTUM, U. S. P. IX. Acid. Phos. Dil.

Diluted Phosphoric Acid. Contains from 9.5 to 10.5 per cent of H_3PO_4 . Method of assay.

Average dose: 2 mils or 30 minims.

ACIDUM SALICYLICUM, U. S. P. IX.

Acid. Salicyl.

Salicylic Acid, Orthohydroxybenzoic Acid. Contains when dried not less than 99.3 per cent of $C_7H_5O_2$. May be obtained from plants or prepared synthetically. Melts between 156° and 159° and leaves not more than 0.1 per cent of ash. Method of assay.

Average dose: 0.75 gm. or 12 grains.

Preparations: N. F.—Collodium Salicyli Compositum, Glycerogelatinum Acidi Salicylici, Unguentum Salicylatum Extensum, Pasta Zinci, Petroxolinum Salicylatum, Pulvis Antisepticus, Pulvis Talci Boro-Salicylatis, Stilus Acidi Salicylici Dilubilis, Mulla Acidi Salicyli, Mulla Creosoti Salicylata.

ACIDUM STEARICUM, U. S. P. IX.

Acid. Stear.

Stearic Acid. Official in European pharmacopœias as Stearinum (E). A mixture of fat acids consisting chiefly of stearic acid. Melting point not below 56°.

Preparation: N. F.—Linimentum Saponato-Camphoratum.

ACIDUM SULPHURICUM, U. S. P. IX.

Acid. Sulph.

Sulphuric Acid; popularly known as oil of Vitriol. Contains from 93 to 95 per cent of H_2SO_4 . Method of assay.

Preparations: U. S. P.—Acidum Sulphuricum Aromaticum, Acidum Sulphuricum Dilutum. Used in making: Liquor Ferri Subsulphatis, Liquor Ferri Tersulphatis.

ACIDUM SULPHURICUM AROMATICUM, U. S. P. IX.

Acid. Sulph. Arom.

Aromatic Sulphuric Acid. Contains free sulphuric acid and ethylsulphuric acid together, equivalent to from 19 to 21 per cent of H_2SO_4 , with tincture of ginger (5), oil of cinnamon (0.1), and alcohol (to make 100). Method of assay for sulphuric acid.

Average dose: 1 mil or 15 minims.

Preparation: N. F.—Infusum Cinchonæ.

ACIDUM SULPHURICUM DILUTUM, U. S. P. IX.

Acid. Sulph. Dil.

Diluted Sulphuric Acid. Contains from 9.5 to 10.5 per cent of H_2SO_4 . Method of assay.

Average dose: 1 mil or 15 minims.

Preparations: N. F.—Infusum Rosæ Compositum, Syrupus Rosæ.

ACIDUM SULPHUROSUM, U. S. P. VIII. Deleted.**ACIDUM TANNICUM, U. S. P. IX.**

Acid. Tann.

Tannic Acid, Gallotannic Acid, Tannin. Official in European pharmacopœias as Acidum Gallotannicum (E), (S). Does not lose more than 12 per cent of its weight when dried at 100° .

Average dose: 0.5 gm. or 8 grains.

Preparations: U. S. P.—Glyceritum Acidi Tannici, Trochisci Acidi Tannici, Unguentum Acidi Tannici.

N. F.—Collodium Stypticum, Syrupus Iodotannicus.

ACIDUM TARTARICUM, U. S. P. IX.

Acid. Tart.

Tartaric Acid. Contains not less than 99.5 per cent of $C_2H_4O_6$. Method of assay and test for lead.

Average dose: 0.5 gm. or 8 grains.

Preparations: U. S. P.—Used in making Sales Effervescentes.

N. F.—Elixir Pepsini Bismuthi et Strychninæ, Glyceritum Bismuthi, Liquor Alumini Acetico-Tartratis, Liquor Sodii Citro-tartratis Effervescens, Sales Effervescentes.

ACIDUM TARTARICUM SACCHARATUM, N. F. III. Deleted.**ACIDUM TRICHLORACETICUM, U. S. P. IX.**

Acid. Trichloracet.

Trichloroacetic Acid. Contains not less than 99 per cent of $C_2HO_2Cl_3$, when dried to constant weight. When incinerated should leave not more than 0.05 per cent of ash. When the acid is heated with potassium hydroxide, it is decomposed with the formation of chloroform and potassium carbonate. Method of assay.

ACONITINA, U. S. P. IX.

Aconitin.

Aconitine. An alkaloid obtained from aconite. Melts at about 195°. Alcohol test with ammonium vanadate.

Average dose: 0.00015 gm. or $\frac{1}{400}$ grain.

Preparation: N. F.—Oleatum Aconitinæ.

ACONITUM, U. S. P.

Aconit.

Aconite, Monkshood, Aconite Root. Included in the International Protocol as *Tubera Aconiti* or *Aconiti Tuber* (P. I.). The dried tuberous root of *Aconitum Napellus* Linné without more than 5 per cent of stems and other foreign matter. Ash not exceeding 6 per cent. 0.5 per cent of ether soluble alkaloids; a chemical and a biological method of assay.

Average dose: 0.03 gm. or $\frac{1}{2}$ grain.

Preparations: U. S. P.—Extractum Aconiti, Fluidextractum Aconiti, Tinctura Aconiti.

ADEPS, U. S. P. IX.

Lard. Official in European pharmacopœias as *Adeps Suillus* (E), *Exungia Proci* (S). The purified internal fat of the abdomen of the hog (*Sus scrofa*, var. *domesticus* Gray, Fam. *Suidæ*). Melts at from 36° to 42°. Has a saponification value of not less than 195 nor more than 203 and an iodine value of not less than 46 nor more than 70.

Preparation: U. S. P.—Adeps Benzoinatus (which see).

ADEPS BENZOINATUS, U. S. P. IX.

Adeps Benz.

Benzoinated Lard. Official in European pharmacopœias as *Adeps Benzoatus* (E), *Axungia Benzoata* (S). Lard treated with 1 per cent of Siam Benzoin.

Preparations: U. S. P.—Cerata Unguenta.

N. F.—Mullæ, Pastæ, Unguenta.

ADEPS LANAE, U. S. P. IX.

Adeps Lan.

Wool-fat. Official in European pharmacopœias as *Adeps Lanæ Anhydricus* (E). The purified fat of the wool of sheep (*Ovis aries* Linné). Melts between 38° and 42°. Vaporizes at higher temperatures. Limit of water 0.5 per cent, ash 0.1 per cent. Tests for soluble oxidizable impurities and for petrolatum. Iodine value not less than 18 nor more than 28.

Preparation: U. S. P.—Adeps Lanæ Hydrosus (which see).

ADEPS LANÆ HYDROSUS, U. S. P. IX.

Adeps Lan. Hyd.

Hydrous Wool-Fat, Lanolin. Official in European pharmacopœias as *Lanolinum* (E). Contains from 25 to 30 per cent of water. Method for determining water content.

Preparations: U. S. P.—Ceratum Plumbi Subacetatis, Unguentum Belladonnæ.

N. F.—Cerata, Inuncta, Petroxolina, Unguenta.

ADONIS, N. F. IV. Part II.

Adonis.

Adonis, Pheasant's Eye. The dried, overground plant of *Adonis vernalis* Linné, without the presence or admixture of more than 5 per cent of foreign matter. Yields not more than 12 per cent of ash.

Average dose: 0.125 gm. or 2 grains.

Preparation: N. F.—Fluidextractum Adonidis.

ÆTHER, U. S. P. IX.

Æth.

Ether, Stronger Ether. Volatile liquid contains from 95.5 to 97.5 per cent of ethyl oxide, $(C_2H_5)_2O$. Ether for anesthesia is to be dispensed only in small well-closed containers. Specific gravity from 0.713 to 0.716. Boiling point about 35° . Modified tests for aldehyde and tests for peroxide.

Average dose: 1 mil or 15 minims.

Preparations: U. S. P.—Spiritus Aetheris. (Used as a solvent.)
N. F.—Spiritus Aetheris Compositus.

ÆTHER ACETICUS, N. F. IV, Part II, from U. S. P. VIII. Æth. Acet.

Acetic Ether, Ethyl Acetate. A liquid containing not less than 96 per cent by volume of $C_4H_8O_2$. Tests for identity and purity.

Average dose: 1 mil or 15 minims.

Preparations: N. F.—Used as a flavor in Elixir Formatum Compositum. Elixir Gentianæ Glycerinatum. Liquor Ferri Peptonati, Liquor Ferri Peptonati et Mangani.

ÆTHYLIS CARBAMAS, U. S. P. IX.

Æthyl. Carbam.

Ethyl Carbamate, also sold as Urethane. The ethyl ester of carbamic acid. Its aqueous solution is neutral to litmus. Melts between 48° and 50° . Ash does not exceed 0.05 per cent. Tests for chloride and nitrate.

Average dose: 1 gm. or 15 grains.

ÆTHYLIS CHLORIDUM, U. S. P. IX.

Æthyl. Chlor.

Ethyl Chloride. Official in European pharmacopœias as Æther Chloratus (E). Monochlorethane, C_2H_5Cl . Boils between 12° and 13° . Specific gravity about 0.921 at 0° .

ÆTHYLMORPHINÆ HYDROCHLORIDUM, U. S. P. IX. New.

Aethylmorph. Hydrochl.

Ethylmorphine Hydrochloride, Ethylmorphine Chloride; also sold as Mono ethylmorphine Hydrochloride and under the trade-name Dionin. The hydrochloride of an alkaloid prepared from morphine by ethylation. Melts at about 123° , with decomposition. Ash non-weighable. Tests for ammonium compounds and for morphine.

Average dose: 0.015 gm. or $\frac{1}{4}$ grain.

AGAR, U. S. P. IX. New.

Agar, Agar-agar. The dried mucilaginous substance extracted from *Gracilaria* (*Sphaerococcus*) *lichenoides* Greville and other marine

algæ growing along the eastern coast of Asia. Ash not exceeding 5 per cent.

Average dose: 10 gm. or 2½ drachms.

AGARICUS, N. F. IV. Part II.

Agaric.

Agaric, White Agaric, Larch Agaric. The dried fruit body of the fungus *Polyporus officinalis* Fries collected from one or more species of *Pinus* Linné, *Larix Adamson*, and *Picea* Link without more than 10 per cent of foreign matter. Yields to boiling alcohol not less than 50 per cent of a resinous extract and not more than 2 per cent of a white ash, rich in phosphates.

Average dose: 0.6 gm. or 10 grains.

Preparations: N. F.—*Pilulæ Antiperiodicæ*, *Pilulæ Antiperiodicæ sine Aloe*, *Tinctura Antiperiodica*, *Tinctura Antiperiodica sine Aloe*, *Tinctura Zedoariæ*.

ALCOHOL, U. S. P. IX.

Alcohol.

Alcohol. Official in European pharmacopœias as Spiritus (E). Contains 92.3 per cent by weight and 94.9 per cent by volume of C_2H_5OH . Residue on evaporation does not exceed 0.005 per cent. Specific gravity not above 0.816 at 15.6°. Tests for methyl alcohol and for acetone.

Preparation: U. S. P.—Alcohol Dilutum. (Used as a solvent.)

ALCOHOL ABSOLUTUM, U. S. P. VIII. See Alcohol Dehydratum. U. S. P. IX.

ALCOHOL DEHYDRATUM, U. S. P. IX.

Alcohol Dehyd.

Dehydrated Alcohol, Alcohol Absolutum, U. S. P. VIII. Official in European pharmacopœias as Alcohol Absolutus (E). Contains not less than 99 per cent by weight of C_2H_5OH . Corresponds to the properties and responds to the tests and reactions given under alcohol.

ALCOHOL DILUTUM, U. S. P. IX.

Alcohol Dil.

Diluted Alcohol. Official in European pharmacopœias as Spiritus Dilutus (E). The U. S. P. preparation contains from 41 to 42 per cent by weight of C_2H_5OH . Made by mixing equal volumes of alcohol and distilled water. Responds to the reactions and tests under alcohol.

Preparations: Used as a solvent.

ALETRIS, N. F. IV. Part II.

Aletr.

Aletris, Unicorn Root, Colic Root, Star Grass. The dried rhizome and roots of *Aletris farinosa* Linné. Yields not more than 16 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparation: N. F.—*Fluidextractum Aletridis*.

ALLIUM, N. F. IV. Part II.

Allium.

Allium, Garlic. The bulb of *Allium Sativum* Linné.

Average dose: 2 gm. or 30 grains.

Preparation: N. F.—*Syrupus Allii*.

ALOE, U. S. P. IX.

Aloe.

Aloes, Socotrine Aloes, Curaçao Aloes, Cape Aloes. Each variety described separately. Ash not exceeding 4 per cent.

Average dose: 0.25 gm. or 4 grains.

Preparations: U. S. P.—*Extractum Colocynthis Compositum*, *Pilulæ Aloes*, *Pilulæ Rhei Compositæ*, *Tinctura Aloes*, *Tinctura Benzoini Composita*.

N. F.—*Extractum Aloes* (which see). *Pilulæ ad Prandium*, *Pilulæ Aloes et Asafetidæ*, *Pilulæ Aloes et Ferri*, *Pilulæ Aloes et Mastiches*, *Pilulæ Aloes et Myrrhæ*, *Pilulæ Aloes et Podophylli Compositæ*, *Pilulæ Aloes Hydrargyri et Podophylli*, *Pilulæ Aloes Hydrargyri et Scammonii Compositæ*, *Pilulæ Colocynthis Compositæ*, *Pilulæ Colocynthis et Hyoscyami*, *Pilulæ Ferri*, *Quininæ*, *Aloes, et Nucis Vomicae*, *Pilulæ Laxativæ Post Partum*, *Pulvis Aloes et Canellæ*, *Tinctura Aloes et Myrrhæ*, *Tinctura Zedoariæ Amara*.

ALOE PURIFICATA, U. S. P. VIII. Deleted.

ALOINUM, U. S. P. IX.

Aloin.

Aloin. A pentoside or mixture of pentosides obtained from aloes. Ash not exceeding 0.5 per cent. 98.5 per cent soluble in distilled water.

Average dose: 0.015 gm. or $\frac{1}{4}$ grain.

Preparations: N. F.—*Pilulæ Aloini Compositæ*, *Pilulæ Aloini*, *Strychninæ et Belladonnæ*, *Pilulæ Aloini*, *Strychninæ et Belladonnæ Compositæ*, *Pilulæ Laxativæ Compositæ*.

ALTHÆA, U. S. P. IX.

Althæa.

Althæa, Marsh Mallow Root. Official in European pharmacopœias as *Radix Althææ* (E). The root of *Althæa officinalis*, Linné. Description elaborated. Ash not exceeding 8 per cent.

Preparations: U. S. P.—*Massæ Hydrargyri*.

N. F.—*Pilulæ Nitroglycerini*, *Species Pectorales*, *Syrupus Althææ*.

ALTHÆÆ FOLIA, N. F. IV. Part II.

Althæ. Fol.

Althæa leaves or Marsh Mallow Leaves. The dried leaves of *Althæa officinalis* Linné, without the presence or admixture of more than 5 per cent of stems or foreign matter. Yields not more than 16 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparation: N. F.—*Species Emollientes*.

ALUMEN, U. S. P. IX.

Alum.

Alum, Ammonium Alum or Potassium Alum, Potash Alum. The potassium alum is official in European pharmacopœias as *Sulfas Aluminico-Kalicus* (S). Contains not less than 99.5 per cent of $\text{AlNH}_4(\text{SO}_4)_2 + 12\text{H}_2\text{O}$ or of $\text{AlK}(\text{SO}_4) + 12\text{H}_2\text{O}$. Method of assay.

Average dose: 0.5 gm. or 8 grains.

Preparations: U. S. P.—*Alumen Exsiccatum*.

N. F.—*Liquor Alumini Acetico-Tartratis*.

ALUMEN EXSICCATUM, U. S. P. IX. Alum. Exsic.

Exsiccated Alum, Alumen Ustum, Dried Alum, Burnt Alum. The potassium salt is official in European pharmacopœias as Alumen Ustum (E), Sulfas Aluminico-Kalicus Ustus (S). Contains when dried not less than 98 per cent of anhydrous $\text{AlNH}_4(\text{SO}_4)_2$, or of anhydrous $\text{AlK}(\text{SO}_4)_2$. Should not be dispensed if it contains more than 10 per cent of moisture. Assay method for moisture.

ALUMINI CHLORIDUM, N. F. IV. Part II. Alum. Chlor.

Aluminum Chloride. Contains $\text{AlCl}_3 + 6\text{H}_2\text{O}$ corresponding to not less than 20.5 per cent of aluminum oxide (Al_2O_3). Tests for identity and purity. Method of assay.

Average dose: 0.3 gm. or 5 grains.

Preparation: N. F.—Liquor Hydrastinæ Compositus.

ALUMINI HYDROXIDUM, U. S. P. IX. Alum. Hydrox.

Aluminum Hydroxide. A compound consisting principally of $\text{Al}(\text{OH})_3$. Made by precipitating a solution of alum with a solution of monohydrated sodium carbonate.

ALUMINI SULPHAS, N. F. IV. Part II. From U. S. P. VIII. Alum. Sulph.

Aluminum Sulphate. Official in Foreign Pharmacopœias as Aluminium Sulfuricum (E), Sulphus Aluminicus (S). Contains not less than 99.5 per cent of $\text{Al}_2(\text{SO}_4)_3 + 16\text{H}_2\text{O}$. Tests for identity and purity and a method of assay.

Preparations: N. F.—Liquor Zinci et Alumini Compositus. Used in making: Liquor Alumini Acetatis, Liquor Alumini Subacetatis.

AMMONII BENZOAS, U. S. P. IX. Ammon. Benz.

Ammonium Benzoate. Official in European pharmacopœias as Ammonium Benzoicum (S). Contains not less than 98 per cent of $\text{NH}_4\text{C}_7\text{H}_5\text{O}_2$. Method of assay.

Average dose: 1 gm. or 15 grains.

AMMONII BROMIDUM, U. S. P. IX. Ammon. Brom.

Ammonium Bromide. Official in European pharmacopœias as Ammonium Bromatum (E), Bromatum Ammonicum (S). Contains when dried not less than 98.5 per cent of NH_4Br . Method of assay.

Average dose: 1 gm. or 15 grains.

Preparations: N. F.—Elixir Ammonii Bromidi, Elixir Trium Bromidorum.

AMMONIUM CARBONAS, U. S. P. IX. Ammon. Carb.

Ammonium Carbonate. Official in European pharmacopœias as Ammonium Carbonicum (E), Supercarbonas Ammonicus (S). A varying mixture of ammonium carbonate and carbamate. Yields from 30 to 32 per cent of NH_3 . Method of assay

Average dose: 0.3 gm. or 5 grains.

Preparations: U. S. P.—*Spiritus Ammonię Aromaticus*. Used in making *Liquor Ammonii Acetatis* (Which see).

N. F.—*Liquor Ferri Salicylatis*, *Mistura Pectoralis*, Stokes, *Mistura Ammonii Chloridi*.

AMMONII CHLORIDUM, U. S. P. IX. Ammon. Chlor.

Ammonium Chloride. Official in European pharmacopœias as Ammonium Chloratum (E), Chloratum Ammonicum (S). Contains when dried not less than 99.5 per cent of NH_4Cl . When ignited yields not more than 0.05 per cent of ash. Method of assay.

Average dose: 0.3 gm. or 5 grains.

Preparations: N. F.—*Mistura Ammonii Chloridum*, *Trochisci Ammonii Chloridi*.

AMMONII HYPOPHOSPHIS, N. F. IV. Part II. Ammon. Hypophos.

Ammonium Hypophosphite. Contains when dried not less than 97.5 per cent of $\text{NH}_4\text{PH}_2\text{O}_3$. Tests for identity and purity and a method of assay.

Average dose: 0.2 gm. or 3 grains.

Preparation: N. F.—*Syrupus Ammonii Hypophosphitis*.

AMMONII IODIDUM, U. S. P. IX. Ammon. Iod.

Ammonium Iodide. Official in European pharmacopœias as Ammonium Iodatum (E). Contains when dried not less than 99 per cent of NH_4I . Should not leave more than 0.1 per cent of residue. Method of assay.

Average dose: 0.3 gm. or 5 grains.

AMMONII PHOSPHAS, N. F. IV. Part II. Ammon. Phos.

Ammonium Phosphate. A mixture of diammonium hydrogen phosphate and ammonium dihydrogen phosphate, corresponding to not less than 20 per cent of combined ammonia (NH_3). Tests for identity and purity and a method of assay.

Average dose: 0.3 gm. or 5 grains.

Preparation: N. F.—*Liquor Phosphatum Compositus*.

AMMONII SALICYLAS, U. S. P. IX. Ammon. Salicyl.

Ammonium Salicylate. Official in European pharmacopœias as Ammonium Salicylicum (E). Contains when dried not less than 98 per cent of $\text{NH}_4\text{C}_7\text{H}_5\text{O}_3$. Method of assay.

Average dose: 0.5 gm. or 8 grains.

AMMONII VALERAS, U. S. P. IX. Ammon. Valer.

Ammonium Valerate, Ammonium Valerianate. A compound of ammonium and valeric acid having a somewhat varying composition. Leaves not more than 0.05 per cent of residue.

Average dose: 0.5 gm. or 8 grains.

Preparation: N. F.—*Elixir Ammonii Valeratis*.

AMYGDALA AMARA, U. S. P. VIII. Deleted.

AMYGDALA DULCIS, U. S. P. IX.

Amygd. Dulc.

Sweet Almond. Official in European pharmacopœias as Semen Amygdala Dulce (E). The ripe seeds of *Prunus Amygdalus dulcis* de Candolle. Ash not exceeding 4 per cent.

Preparation: U. S. P.—Emulsum Amygdalæ.

AMYLIS NITRIS, U. S. P. IX.

Amyl. Nitris.

Amyl Nitrite. Official in European pharmacopœias as Amylium Nitrosum (E), Nitris Amylicus (S). Contains not less than 80 per cent of $C_6H_{11}NO_2$ (chiefly iso-amyl nitrite. Method of assay.

Average dose: 0.2 mil or 3 minims by inhalation.

AMYLUM, U. S. P. IX.

Amyl.

Starch, Corn Starch. The starch grains of *Zea mays*, Linné. Ash should not exceed 0.5 per cent.

Preparations: U. S. P.—Glyceritum Amyli; used in making extracts.

N. F.—Pasta Resorcinolis Fortis, Pasta Resorcinolis Mitis, Pasta Zinci, Stili Acidi Salicylici Dilubilis.

AMYLUM IODATUM, N. F. III. Deleted.

ANETHOL, N. F. IV. Part. II.

Anethol.

Anethol. The methyl ether of para-propenyl phenol ($C_6H_4C_3H_5OCH_3$). It is the main constituent in the oils of anise, star anise, and fennel. Specific gravity 0.984 to 0.986 at 25°. Boiling point 232° to 234°.

Average dose: 0.2 mil or 3 minims.

Preparations: N. F.—Elixir Anisi, Pulvis Rhei et Magnesie Anisatus, Spiritus Ammonii Anisatis, Spiritus Cardamomi Compositus.

ANGELICÆ FRUCTUS, N. F. IV. Part II.

Angel. Fruct.

Angelica fruit, Angelica Seed. The ripe fruit of *Angelica Archangelica* Linné without the presence or admixture of more than 3 per cent of other matter. Yields not more than 8 per cent of a.h.

Average dose: 1 gm. or 15 grains.

Preparations: N. F.—Pilulæ Antiperiodicæ, Pilulæ Antiperiodicæ sine Aloe, Tinctura Antiperiodica, Tinctura Antiperiodica sine Aloe.

ANGELICÆ RADIX, N. F. IV. Part II.

Angel. Rad.

Angelica Root. The rhizome and roots of *Angelica archangelica* Linné without the presence or admixture of more than 5 per cent of stem bases and leaves. Yields not more than 8 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparation: N. F.—Fluidextractum Angelicæ Radicis.

ANISUM, U. S. P. IX.

Anis.

Anise, Aniseed. Official in European pharmacopœias as Fructus Anisi (E). The dried ripe fruit of *Pimpinella Anisum* Linné without

more than 3 per cent of foreign seed and other vegetable matter.
Ash not exceeding 9 per cent.

Average dose: 0.5 gm. or 8 grains.

Preparation: U. S. P.—See *Oleum Anisi*.

N. F.—*Species Laxativæ*, *Species Pectorales*, *Tinctura Rhei Dulcis*.

ANTHEMIS, U. S. P. VIII. Deleted.

ANTIMONII ET POTASSII TARTRAS, U. S. P. IX. Antim. et Pot. Tart.

Antimony and Potassium Tartrate, Antimonyl Potassium Tartrate, Tartrated Antimony, Tartar Emetic. Official in European pharmacopœias as *Tartarus Stibiatus* (E), *Tartras Stibico-Kalicus* (S). Contains not less than 98.5 per cent of $2K(SbO)C_4H_4O_6 + H_2O$. Method of assay.

Average dose: Expectorant 0.005 gm. or $\frac{1}{12}$ grain.

Preparations: U. S. P.—*Mistura Glycyrrhizæ Composita*, *Syrupus Scillæ Compositus*.

N. F.—*Pilulæ ad Prandium*, Cole's, *Vinum Antimonii*.

ANTIMONII OXIDUM, N. F. IV. Part II Antim. Oxid.

Antimony Oxide. Contains not less than 97 per cent of antimonous oxide, Sb_2O_3 . Tests for identity and purity and a method of assay.

Average dose: 0.06 gm. or 1 grain.

Preparation: N. F.—*Pulvis Antimonialis*.

ANTIMONII SULPHIDUM PURIFICATUM, N. F. III. Deleted.

ANTIMONIUM SULPHURATUM, N. F. Part II. Antim. Sulphurat.

Sulphurated Antimony, Antimonium Oxysulphuratum, Kermes Mineral. Chiefly Antimony Trisulphide (Sb_2S_3), with small quantities of antimony trioxide, sodium pyroantimonate and free sulphur. It contains not less than 45 per cent of Sb.

Preparation: N. F.—*Pilulæ Antimonii Compositæ*.

ANTIPIRYNA, U. S. P. IX. Antipyr.

Antipyrine, Phenyl dimethylpyrazolon, Phenazone $C_{11}H_{12}N_2O$. Included in several European Pharmacopœias as *Pyrazolonum Phenyl dimethylicum* (E). Is to be preserved in well closed containers. Melts between 111 and 113°. Ash does not exceed 0.1 per cent.

Average dose: 0.3 gm. or 5 grains.

APII FRUCTUS, N. F. IV. Part II. Apii Fruct.

Celery Fruit, Celery Seed. The ripe fruit of *Apium graveolens* Linné without admixture of more than 10 per cent of other fruits and foreign matter. Yields not more than 8 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparation: N. F.—*Fluidextractum Apii Fructus*.

APOCYNUM, N. F. IV. Part II. From U. S. P. VIII. Apocyn.

Apocynum, Canadian Hemp. The dried rhizome and roots of *Apocynum cannabinum* Linné without admixture of more than 5 per cent of stems and foreign matter.

Average dose: 0.75 gm. or 12 grains.

Preparation: N. F.—Fluidextractum Apocyni.

APOMORPHINÆ HYDROCHLORIDUM, U. S. P. IX. Apmorph. Hydrochl.

Apomorphine Hydrochloride, Apomorphine Chloride. Official in European pharmacopœias as Apomorphinum Hydrochloridum (E), Chloretum Apomorphicum (S). The hydrochloride of an alkaloid prepared from morphine by the abstraction of one molecule of water. Must be rejected if it imparts at once an emerald green color when shaken with 100 parts of distilled water. Identity tests for decomposition products.

Average dose: Expectorant, 0.003 gm. or $\frac{1}{20}$ grain; emetic by mouth, 0.01 gm. or $\frac{1}{8}$ grain; emetic hypodermic, 0.005 gm. or $\frac{1}{25}$ grain.

AQUÆ AROMATICÆ, U. S. P. IX.

Aromatic Waters. A description and a general process for making saturated aqueous solutions of volatile oils.

AQUA, U. S. P. IX.

Aqua.

Water. A colorless, limpid liquid, practically tasteless and odorless. Solids limited to 0.03 w/v per cent. Tests for organic impurities, chlorides, nitrites, nitrates, and ammonium compounds.

Preparations: U. S. P.—Aqua Destillata, Aqua Destillata Sterilisata. (Used as a solvent).

AQUA AMMONIÆ, U. S. P. IX.

Aq. Ammon.

Ammonia Water. Official in European pharmacopœias as Liquor Ammonii Caustici (E), Solutio Ammoniaci (S). Contains from 9.5 to 10.5 per cent of NH_3 . This solution deteriorates on keeping and must be tested frequently. Specific gravity about 0.958 at 25°. Residue on evaporation not to exceed 0.02 per cent. Method of assay.

Average dose: 1 mil or 15 minims.

Preparations: U. S. P.—Linimentum ammoniæ, Spiritus Ammoniae Aromaticus.

N. F.—Used in making: Elixir Ammonii Valeratis, Elixir Ferri Pyrophosphatis, Quininæ et Strychninæ, Fluidglyceratum Glycyrrhizæ, Linimentum Ammonii Iodidi, Linimentum Opii Compositum, Linimentum Saponato-Camphoratum, Liquor Ammonii Citratis, Liquor Carmini, Liquor Ferri Acetatis, Liquor Ferri Citratis, Liquor Ferri Nitratis, Liquor Ferri Oxychloridi, Lotio Ammoniacalis Camphorata, Magma Ferri Hydroxidi, Mistura Pectoralis, Stokes, Spiritus Ammonii Anisatus, Tinctura Ergotæ Ammoniata, Vinum Carnis et Ferri, Olea Infusa.

AQUA AMMONIÆ FORTIOR, U. S. P. IX. Aq. Ammon. Fort.

Stronger Ammonia Water. Official in European pharmacopœias as *Solutio Ammoniaci Concentrata* (S). Contains from 27 to 29 per cent of NH_3 . Specific gravity about 0.897 at 25°. Method of assay.

Preparations: N. F.—*Petroxolinum Iodi*, *Petroxolinum Liquidum* (which see), *Petroxolinum Spissum*, *Spiritus Ammoniz*, *Tinctura Iodo Decolorata*.

AQUA AMYGDALÆ AMARÆ, U. S. P. IX. Aq. Amygd. Amar.

Bitter Almond Water. Oil of bitter almond dissolved in recently boiled distilled water.

Average dose: 4 mils or 1 fluidrachm.

AQUA ANISI, U. S. P. IX. Aq. Anis.

Anise Water. Oil of Anise dissolved in recently boiled distilled water.

Average dose: 15 mils or 4 fluidrachms.

AQUA AURANTII FLORUM, U. S. P. IX. Aq. Aurant. Flor.

Orange Flower Water. Equal parts of stronger orange flower water and recently boiled distilled water.

Preparations: U. S. P.—*Syrupus Aurantii Florum*, *Syrupus Calcii Lactophosphatis*, *Syrupus Lactucarii*.

N. F.—*Liquor Hypophosphitum Compositus*, *Liquor Phosphatum Compositus*, *Syrupus Ferri Hypophosphitis*, *Syrupus Ferri Protochloridi*.

AQUA AURANTII FLORUM FORTIOR, U. S. P. IX.

Aq. Aurant. Flor. Fort.

Stronger Orange Flower Water. A saturated aqueous solution prepared by distilling the fresh flowers of *Citrus aurantium amara* Linné with water. Must be free from empyreuma, mustiness, or mucoid growths.

Preparations: U. S. P.—*Aqua Aurantii Florum*. Used in making trochisci.

N. F.—*Elixir Amygdalæ Compositum*, *Elixir Aurantii Amari*, *Elixir Glycyrrhizæ Aquosum*.

AQUA CAMPHORÆ, U. S. P. IX. Aq. Camph.

Camphor Water. A solution of camphor in recently boiled distilled water.

Average dose: 10 mils or 2½ fluidrachms.

Preparations: N. F.—*Mistura Camphoræ Acida*, *Mistura Camphoræ Aromatica*.

AQUA CHLOROFORMI, U. S. P. IX. Aq. Chlorof.

Chloroform Water. A saturated solution of chloroform in freshly boiled distilled water.

Average dose: 15 mils or 4 fluidrachms.

Preparations: N. F.—Used in making: *Extractum Ergotæ Aquosum*, *Fluidglycerata*.

AQUA CINNAMOMI, U. S. P. IX.

Aq. Cinnam.

Cinnamon Water. A saturated solution of oil of cinnamon in recently boiled distilled water.

Average dose: 15 mils or 4 fluidrachms.

Preparations: U. S. P.—*Infusum Digitalis*, *Mistura Cretæ*.

N. F.—*Mistura Guaiaci*, *Syrupus Cinnamomi*, *Syrupus Ipecacuanhæ et Opii*, *Tinctura Ferri Pomata*, *Tinctura Rhei Aquosa*.

AQUA CREOSOTI, U. S. P. IX.

Aq. Creosot.

Creosote Water. A solution of creosote in recently boiled distilled water.

Average dose: 10 mils or 2½ fluidrachms.

AQUA DESTILLATA, U. S. P. IX.

Aq. Dest.

Distilled Water. To be distilled from a suitable apparatus and comply with the tests given. Must be neutral to the official indicators and be free from chlorides calcium, ammonia, carbon dioxide, and organic or other oxidizable substances.

AQUA DESTILLATA STERILISATA, U. S. P. IX. New.

Aq. Dest. Steril.

Sterilized Distilled Water. Freshly distilled water sterilized. Should be used within 48 hours after its preparation.

AQUA FŒNICULI, U. S. P. IX.

Aq. Fœnic.

Fennel Water. A saturated solution of oil of fennel in recently boiled distilled water.

Average dose: 15 mils or 4 fluidrachms.

AQUA HAMAMELIDIS, U. S. P. IX.

Aq. Hamam.

Hamamelis Water, Witch Hazel Water, Distilled, Extract of Witch Hazel. A saturated aqueous liquid obtained by distilling with steam or water the entire shrub of *Hamamelis virginiana* Linné. It is neutral to litmus paper. Must be free from metallic impurities, dissolved impurities, formaldehyde, and methyl alcohol.

AQUA HYDROGENII DIOXIDI, U. S. P. VIII. See *Liquor Hydrogenii Dioxidii*, U. S. P. IX.

AQUA MENTHÆ PIPERITÆ, U. S. P. IX.

Aq. Menth. Pip.

Peppermint Water. A saturated solution of oil of peppermint in recently boiled distilled water.

Average dose: 15 mils or 4 fluidrachms.

AQUA MENTHÆ VIRIDIS, U. S. P. IX.

Aq. Menth. Vir.

Spearmint water. A saturated solution of oil of spearmint in recently boiled distilled water.

Average dose: 15 mils or 4 fluidrachms.

Preparation: N. F.—*Liquor Sodæ et Menthæ*.

AQUA PHENOLATA, N. F. IV. New. Aq. Phenol.

Phenolated Water, Carbolic Acid Water. Included in the International Protocol as *Phenoli Solutio* or *Aqua Phenolata* P. I. A simple solution of phenol (2 per cent) in distilled water.

AQUA ROSÆ, U. S. P. IX. Aq. Ros.

Rose Water. A mixture of equal parts of stronger rose water and recently boiled distilled water. Should comply with the tests for identity and purity described under *Aqua Rosæ Fortior*.

Preparations: N. F.—*Linimentum Terebinthinæ Aceticum*. *Mistura Ferri Composita*.

AQUA ROSÆ FORTIOR, U. S. P. IX. Aq. Ros. Fort.

Stronger Rose Water. A saturated aqueous distillate prepared by distilling the fresh flowers of *Rosa Centifolia* Linné. Required to be free from empyreuma, mustiness, or mucoid growths. Should be neutral or only slightly acid to litmus paper. Should give no reaction for metallic impurities.

Preparations: U. S. P.—*Aqua Rosæ*, *Unguentum Aquæ Rosæ*.

N. F.—*Confectio Rosæ*.

AQUA SEDATIVA, N. F. III. See *Lotio Ammoniacalis Camphorata*, N. F. IV.

ARALIA, N. F. IV. Part II. Aralia.

Aralia, American Spikenard, Spignet. The dried rhizome and roots of *Aralia racemosa* Linné, without admixture of more than 5 per cent of adhering stem bases. Yields not more than 10 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparations: N. F.—*Fluidextractum Araliæ*, *Syrupus Pini Strobi Composita cum Morphina*, *Syrupus Pini Strobi Composita sine Morphina*.

ARGENTI CYANIDUM, U. S. P. VIII. Deleted.

ARGENTI NITRAS, U. S. P. IX. Arg. Nit.

Silver Nitrate. Official in European pharmacopœias as *Nitras Argenticus* (S), *Argentum Nitricum* (E). Contains when dry not less than 99.8 per cent of AgNO_3 . Method of assay.

Average dose: 0.01 gm. or $\frac{1}{4}$ grain.

Preparation: U. S. P.—*Argenti Nitræ Fusus*.

ARGENTI NITRAS FUSUS, U. S. P. IX. Arg. Nit. Fus.

Moulded Silver Nitrate, Fused Silver Nitrate, Lunar Caustic. Official in European pharmacopœias as *Argentum Nitricum Fusum* (E). Contains not less than 94.5 per cent of AgNO_3 with a small proportion of chloride. Modified method of assay.

ARGENTI NITRAS MITIGATUS, U. S. P. VIII. Deleted.

ARGENTI OXIDUM, U. S. P. IX.

Arg. Oxid.

Silver Oxide. Contains when dried not less than 99.6 per cent of AgO. Method of assay.

Average dose: 0.06 gm. or 1 grain.

ARNICA, U. S. P. IX.

Arnic.

Arnica, Arnica Flowers. Official in European pharmacopœias as Flores Arnicæ (E). The dried flower-heads of *Arnica montana* Linné. Yields not more than 9 per cent of ash.

Preparations: U. S. P.—Tinctura Arnicæ.

N. F.—Fluidextractum Arnicæ Florum.

ARSENI IODIDUM, U. S. P. IX.

Arsen. Iod.

Arsenous Iodide, Arsenic Iodide. Contains when dried not less than 99 per cent of AsI₃. Method of assay.

Average dose: 0.005 gm. or $\frac{1}{12}$ grain.

Preparation: U. S. P.—Liquor Arseni et Hydrargyri Iodidi.

ARSENI TRIOXIDUM, U. S. P. IX.

Arsen. Triox.

Arsenic Trioxide, Arsenous Acid, Arsenous Oxide, White Arsenic. Official in European pharmacopœias as Acidum Arsenicosum (E). Contains, when dried, not less than 99.8 per cent of As₂O₃. May occur as amorphous, transparent, and colorless masses, like glass, or as a crystalline, opaque, and white solid, resembling porcelain. Method of assay.

Average dose: 0.002 gm. or $\frac{1}{30}$ grain.

Preparations: U. S. P.—Liquor Acidi Arsenosi, Liquor Potassii Arsenitis.

N. F.—Liquor arsenicalis, Clemens, Liquor Auri et Arseni Bromidi; Pilulæ Ferri, Quininæ, Strychninæ et Arsenici Fortior; Pilulæ Ferri, Quininæ, Strychninæ et Arsenici Mitis.

ASAFCETIDA, U. S. P. IX.

Asafœt.

Asafetida, Gum Asafetida. Official in European pharmacopœias as Asa Fœtida (E). The gum-resin obtained from *Ferula asafœtida* Linné and *Ferula fœtida* Regel. Yields not less than 60 per cent (or if powdered, 50 per cent) of alcohol-soluble constituents. Ash not exceeding 15 per cent. Powdered asafetida yields not exceeding 30 per cent of ash. Method of assay.

Average dose: 0.25 gm. or 4 grains.

Preparations: U. S. P.—Emulsum Asafœtidæ, Pilulæ Asafœtidæ, Tinctura Asafœtidæ.

N. F.—Pilulæ Aloes et Asafœtidæ.

ASARUM, N. F. IV. Part II.

Asarum.

Asarum, Canada Snake-Root, Wild Ginger. The dried rhizome of *Asarum Canadense* Linné, with only an occasional leaf or flower present. Yields not more than 12 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparation: N. F.—Syrupus Asari Compositus.

ASCLEPIAS, N. F. IV. Part II.

Asclep.

Asclepias, Pleurisy Root. The dried roots of *Asclepias tuberosa* Linné, without the presence of more than 5 per cent of foreign matter. Yields not more than 9 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparation: N. F.—Fluidextractum Asclepiadis.

ASPIDIUM, U. S. P. IX.

Aspidium.

Aspidium, Male Fern. Official in European pharmacopœias as Rhizoma Filicis (E). The rhizome and stipes of *Dryopteris filix-mas* Linné, or *Dryopteris marginalis* Linné. Only the portions retaining their green color are to be used. Ash not exceeding 3 per cent.

Average dose: 4 gm. or 60 grains.

Preparation: U. S. P.—Oleoresina Aspidii.

ASPIDOSPERMA, U. S. P. IX. New.

Aspidosp.

Aspidosperma, Quebracho. The dried bark of *Aspidosperma quebracho blanco* Schlechtendal without admixture of more than 2 per cent of wood and other foreign matter.

Average dose: 4 gm. or 60 grains.

Preparation: U. S. P.—Fluidextractum Aspidospermatis.

ATROPINA, U. S. P. IX.

Atrop.

Atropine. An alkaloid obtained from belladonna and other plants of the *Solanaceæ*. Melts between 114° and 116°. Should be free from ash and foreign alkaloids. Test to distinguish from hyoscyamine.

Average dose: 0.0005 gm. or $\frac{1}{120}$ grain.

Preparation: N. F.—Oleatum Atropinæ.

ATROPINÆ SULPHAS, U. S. P. IX.

Atrop. Sulph.

Atropine Sulphate. Official in European pharmacopœias as Sulfas Atropicus (S), Atropinum Sulfuricum (E). The sulphate of the alkaloid atropine. Usually melts between 188° and 191°, but when anhydrous and free from hyoscyamine between 181° and 183°.

Average dose: 0.0005 gm. or $\frac{1}{120}$ grain.

AURANTII AMARI CORTEX, U. S. P. IX.

Aurant. Amar. Cort.

Bitter Orange Peel. The dried rind of the fruit of *Citrus aurantium amara* Linné. Yields not more than 7 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparations: U. S. P.—Fluidextractum Aurantii Amari, Tinctura Aurantii Amari, Tinctura Cinchonæ Composita, Tinctura Gentianæ Composita.

N. F.—Infusum Gentianæ Compositum, Tinctura Amara, Vinum Aurantii Compositum.

AURANTII DULCIS CORTEX, U. S. P. IX.

Aurant. Dulc. Cort.

Sweet Orange Peel. The outer rind of the fresh ripe fruit of *Citrus aurantium sinensis* galesio.

Preparation: U. S. P.—Tinctura Aurantii Dulcis.

AURI ET SODII CHLORIDUM, U. S. P. IX. Aur. et Sod. Chlor.

Gold and Sodium Chloride. Official in European pharmacopœias as Auro-natrium Chloratum (E). A mixture of equal parts of anhydrous gold chloride and anhydrous sodium chloride, representing when dried not less than 30 per cent of metallic gold. Tests for impurities and a method of assay.

Average dose: 0.005 gm. or $\frac{1}{12}$ grain.

BALSAMUM PERUVIANUM, U. S. P. IX. Bals. Peruv.

Balsam of Peru, Peru Balsam. A balsam obtained from *Toluiſera pereiræ* Baillon. Specific gravity, 1.130 to 1.160 at 25°. Tests for fixed oils, turpentine, and rosin. Acid number, from 56 to 84. The saponification value of the cinnamein, from 235 to 238.

Preparation: N. F.—Mistura Oleo-Balsamica.

BALSAMUM TOLUTANUM, U. S. P. IX. Bals. Tolu.

Balsam of Tolu, Tolu Balsam. A balsam obtained from *Toluiſera balsamum* Linné. Nearly insoluble in water and petroleum benzin. Tests for rosin and copaiba. Acid number, from 112 to 168. Saponification value, from 154 to 220.

Preparations: U. S. P.—Tinctura Benzoini Composita, Tinctura Tolutana (which see).

BALSAMUM TRAUMATICUM, N. F. III. Deleted.

BAPTISIA, N. F. IV. Part II. Baptis.

Baptisia, Wild Indigo. The dried roots of *Baptisia tinctoria* R. Brown, without admixture of more than 10 per cent of the crown and stem. Yields not more than 5 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparation: N. F.—Fluidextractum Baptisiæ.

BELLADONNÆ FOLIA, U. S. P. IX. Bellad. Fol.

Belladonna Leaves, Deadly Nightshade Leaves. Included in the International Protocol as *Belladonnæ folium*, *Folium Belladonnæ* (P. I.). The dried leaves and tops of *Atropa belladonna* Linné, without admixture of more than 10 per cent of stems, and yielding not less than 0.3 per cent of the total alkaloids from Belladonna leaves.

Average dose: 0.06 gm. or 1 grain.

Preparations: U. S. P.—Extractum Belladonnæ Foliorum (which see), Tinctura Belladonnæ Foliorum.

BELLADONNÆ RADIX, U. S. P. IX. Bellad. Rad.

Belladonna Root, Deadly Nightshade Root. The dried root of *Atropa Belladonna* Linné without admixture of more than 10 per cent of stem-bases, and yielding not less than 0.45 per cent of the total alkaloids from belladonna root. Method of assay.

Average dose: 0.045 gm. or $\frac{1}{4}$ grain.

Preparation: U. S. P.—Fluidextractum Belladonnæ Radicis (which see).

BENZALDEHYDUM, U. S. P. IX.

Benzaldehyd.

Benzaldehyde. An aldehyde produced synthetically or obtained from oil of bitter almond. Contains not less than 85 per cent of C_7H_6O . Specific gravity about 1.045 at 25°. Method of assay.

Average dose: 0.03 mil or $\frac{1}{4}$ minim.

BENZINUM, U. S. P. VIII. Deleted.**BENZINUM PURIFICATUM**, U. S. P. IX.

Benzin, Purif.

Purified Petroleum Benzin, Petroleum Ether. A purified distillate from American petroleum. Specific gravity 0.638 to 0.660 at 25°. Distills completely between 40° and 80°.

Preparation: U. S. P.—Used in making *Tinctura Opii Deodorati*.

BENZOINUM, U. S. P. IX.

Benzoin.

Benzoin, Gum Benjamin. Official in European pharmacopœias as *Benzoe* (E). A balsamic resin obtained from *Styrax benzoin* Dryander and some other species of *Styrax*. The drug is known in commerce as Sumatra benzoin and Siam benzoin. Described separately. Sumatra benzoin does not yield more than 2.5 per cent of ash. Siam benzoin does not yield more than 2 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparations: U. S. P.—*Adeps Benzoïnatus*, *Tinctura Benzoini*, *Tinctura Benzoini Composita*.

N. F.—*Sevum Benzoïnatum*.

BENZOSULPHINIDUM, U. S. P. IX.

Benzosulphinid.

Benzosulphinide, Saccharin, Glusidum. Official in European pharmacopœias as *Saccharinum* (E). The anhydride of orthosulphamide-benzoic acid. A saturated aqueous solution is acid to litmus. Benzosulphinide melts between 219° and 222°. On incineration leaves not more than 0.5 per cent of ash. Tests for carbonizable impurities, glucose, milk-sugar, benzoic or salicylic acid, and ammonium compounds.

Average dose: 0.2 gm., or 3 grains.

Preparations: U. S. P.—*Fluidextractum Cascaræ Sagradæ Aromaticum*.

N. F.—*Oleum Ricini Aromaticum*.

BERBERIS, N. F. IV. Part II. From U. S. P. VIII.

Berber.

Berberis, Oregon Grape Root. The rhizome and roots of species of the section *Odostemon* Rafinesque of the genus *Berberis* Linné without admixture of more than 5 per cent of the overground parts of the plant or foreign matter. Yields not more than 5 per cent of ash.

Average dose: 2 gm., or 30 grains.

Preparation: N. F.—*Fluidextractum Berberidis*.

BETAEUCAINE HYDROCHLORIDUM, U. S. P. IX. New.

Betaeucain. Hydrochl.

Betaeucaine Hydrochloride, Eucaine Chloride, Eucaine. A synthetic derivative of piperidine, containing when dried not less than 99 per cent of 2, 6, 6-trimethyl-4-benzoxypiperidine ($C_{15}H_{21}NO, HCl$). Tests for readily carbonizable impurities, cocaine, and alpha-eucaine and a method of assay.

BETANAPHTHOL, U. S. P. IX.

Betanaph.

Bethanaphthol, Naphthol. Official in European pharmacopœias as Naphtholum (E). A monohydroxyphenol ($C_{10}H_7OH$) of the naphthalene series. Melts between 120° and 122° . Leaves not more than 0.05 per cent of ash.

Average dose: 0.25 gm., or 4 grains.

Preparations: N. F.—Liquor Zinci et Alumini Compositus, Liquor Zinci et Ferri Compositus, Pasta Betanaphtholis, Petroxolinum Betanaphtholis.

BISMUTHI BETANAPHTHOLAS, U. S. P. IX. New. Bism. Betanaph.

Bismuth Betanaphthol. Also sold as Orphol. A compound of bismuth and betanaphthol of somewhat varying composition, yielding not less than 15 per cent of betanaphthol and, upon ignition, not less than 73 per cent nor more than 78 per cent of bismuth oxide. Tests for free betanaphthol and other impurities and methods of assay for betanaphthol and for bismuth oxide.

Average dose: 0.5 gm., or 8 grains.

BISMUTHI CITRAS, U. S. P. VIII. Deleted.**BISMUTHI ET AMMONII CITRAS, U. S. P. IX. Bism. et Ammon. Cit.**

Bismuth and Ammonium Citrate, Bismuth Ammonio-Citrate. Bismuth citrate rendered soluble by the presence of ammonium citrate. Yields upon ignition from 46 to 52 per cent of bismuth oxide (Bi_2O_3). Tests for nitrate and other impurities and a method of assay.

Average dose: 0.125 gm., or 2 grains.

BISMUTHI OXIDUM HYDRATUM, N. F. III. Deleted.**BISMUTHI SUBCARBONAS, U. S. P. IX.**

Bism. Subcarb.

Bismuth Subcarbonate. A basic bismuth carbonate of varying composition. Yields not less than 90 per cent of bismuth oxide (Bi_2O_3). Tests for impurities and a method of assay.

Average dose: 0.5 gm. or 8 grains.

BISMUTHI SUBGALLAS, U. S. P. IX.

Bism. Subgal.

Bismuth Subgallate, Dermatol. Official in European pharmacopœias as Subgallas Bismuthicus (S). Basic Bismuth gallate of varying composition. Contains from 52 to 57 per cent of bismuth oxide. Tests for free gallic acid and other impurities and a method of assay.

Average dose: 0.5 gm. or 8 grains.

BISMUTHI SUBNITRAS, U. S. P. IX.

Bism. Subnit.

Bismuth Subnitrate. Official in European pharmacopœias as Bismutum Subnitricum (E). Subnitras Bismuthicus (S). A basic bismuth nitrate of varying composition. Contains not less than 79 per cent of bismuth oxide (Bi_2O_3). Tests for alkalies and other impurities and a method of assay.

Average dose: 0.5 gm. or 8 grains.

Preparation: U. S. P.—Used in making Magma Bismuthi.

N. F.—Glyceritum Bismuthi, Unguentum Resorcinolis Compositum.

BISMUTHI SUBSALICYLAS, U. S. P.

Bism. Subsalieryl.

Bismuth Subsalieryl. Official in European pharmacopœias as Bismutum Subsalierylicum (E), Subsalierylas Bismuthicus (S). Yields when dried from 62 to 66 per cent of bismuth oxide. Tests for free salieryl acid and a method of assay.

Average dose: 0.5 gm. or 8 grains.

BOLDO, N. F. IV. Part II.

Boldc.

Boldo, Boldo Leaves. The leaves of *Boldu Boldus* Molina, without admixture of more than 2 per cent of stems or foreign matter. Yields not more than 10 per cent of ash.

Average dose: 0.5 gm. or 8 grains.

Preparation: N. F.—Fluidextractum Boldi.

BOROGLYCERINUM, N. F. III. Deleted.**BRAYERA, N. F. IV. Part II From U. S. P. VIII.**

Brayer.

Brayera, Koussou, Cusso. The dried panicles of the pistillate flowers of *Hagenia Abyssinica* Gmelin, without admixture of more than 10 per cent of other parts of the tree or foreign matter. Yields not more than 9 per cent of ash.

Average dose: 15 gm. or 240 grains.

Preparation: N. F.—Infusum Brayeræ.

BROMOFORMUM, U. S. P. IX.

Bromof.

Bromoform. Official in European pharmacopœias as Bromoformum (E). Contains about 96 per cent of CHBr_3 and about 4 per cent of dehydrated alcohol. Tests for free bromine and for acetone.

Average dose: 0.2 mil or 3 minims.

BROMUM, N. F. IV. Part II From U. S. P. VIII.

Br.

Bromine. Contains not less than 98 per cent of Br and not more than 2 per cent of Cl. Tests for identity and purity. Method of assay.

Preparation: N. F.—Liquor Bromi.

BRYONIA, N. F. IV. Part II.

Bryon.

Bryonia, Bryony. The dried root of *Bryonia alba* Linné or of *Bryonia dioica* Jacquin. Yields not more than 8 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparation: N. F.—Tinctura Bryoniæ.

BUCHU, U. S. P. IX.

Buchu.

Buchu. The dried leaves of *Barosma betulina* Bartling and Wendlan, known in commerce as Short Buchu; or of *Barosma serratifolia* Wildenow, known in commerce as Long Buchu; without admixture of more than 10 per cent of stems and other foreign matter. The two drugs are described separately. The ash does not exceed 4 per cent.

Average dose: 2 gm. or 30 grains.

Preparation: U. S. P.—Fluidextractum Buchu (which see).

N. F.—Fluidextractum Buchu Compositum (which see).

CACAO PRÆPARATA, N. F. IV. Part II.

Cacao Prep.

Cocoa, Prepared Cacao, Soluble Cocoa. A powder prepared from the roasted, cured kernels of the ripe seeds of *Theobroma Cacao* Linné and other species of *Theobroma* deprived of a portion of their fat. Yields from 3.5 to 8 per cent of ash, which has a distinctive reddish color. Tests for identity and purity.

Preparations: N. F.—Trochisci Quininae Tannatis, Trochisci Santonini, Trochisci Santonini Compositi.

CACTUS GRANDIFLORUS, N. F. IV. Part II.

Cact. Grand.

Cactus grandiflorus, Night Blooming Cereus. The fresh succulent stems of the wild growing *Cactus Grandiflorus* Linné.

Preparation: N. F.—Tinctura Cacti Grandiflori.

CAFFEINA, U. S. P. IX.

Caffein.

Caffeine, Theine. Also official in European pharmacopœias as Coffeinum (S). A feebly basic substance obtained from the leaves of *Thea sinensis* Linné or from the seeds of *Coffea arabica* Linné; also occurring in some other plants. Melts between 235° and 237°. At 80° it loses not more than 9 per cent of its weight on drying. Yields not more than 0.05 per cent of ash.

Average dose: 0.15 gm. or 2½ grains.

Preparations: U. S. P.—Caffeina Citrata, Caffeinae Sodii Benzoas.

N. F.—Caffeinae Sodii-Salicylas, Pulvis Acetanilidi Compositus, Sal Potassii Bromidi Effervescens Compositus.

CAFFEINA CITRATA, U. S. P. IX.

Caff. Cit.

Citrated Caffeine. Official in European pharmacopœias as Coffeinum Citricum (W). An unstable compound of caffeine and citric acid, containing, when dried, not less than 48 per cent of anhydrous caffeine. At 80° it loses not more than 5 per cent of its weight and on incineration yields not more than 0.1 per cent of ash.

Average dose: 0.3 gm. or 5 grains.

Preparation: U. S. P.—Caffeina Citrata Effervescens.

CAFFEINA CITRATA EFFERVESCENS, U. S. P.

Caff. Cit. Eff.

Effervescent Citrated Caffeine. Contains not less than 1.9 per cent of anhydrous caffeine. Formula for making and method of assay.

Average dose: 4 gm. or 1 drachm.

CAFFEINÆ SODIO-BENZOAS, U. S. P. IX. From N. F. III.

Caff. Sod. Benz.

Caffeine Sodio-Benzoate. A mixture of caffeine and sodium benzoate. Contains, when dried, from 46 to 50 per cent of anhydrous caffeine, the remainder being sodium benzoate. Tests for readily carbonizable organic matter and a method of assay.

Average dose: By mouth, 0.3 gm. or 5 grains; hypodermic, 0.2 gm. or 3 grains.

CAFFEINÆ SODIO-SALICYLAS, N. F. IV.

Caff. Sod. Salicyl.

Caffeine Sodio-Salicylate. An intimate mixture of equal parts of caffeine and sodium salicylate.

Average dose: 0.2 gm. or 3 grains.

CALAMINA PRÆPARATA, N. F. IV. Part II.

Calamin, Præp.

Prepared Calamine, Lapis Calaminaris. Native zinc carbonate containing a varying amount of zinc silicate or calcined zinc carbonate containing a small amount of ferric oxide.

Preparation: N. F.—Unguentum Calaminæ.

CALAMUS, U. S. P. VIII. Deleted.**CALCII BROMIDUM**, U. S. P. IX.

Calc. Brom.

Calcium Bromide. Now contains not less than 84 per cent of CaBr_2 . Tests for contaminations and a method of assay.

Average dose: 1 gm. or 15 grains.

Preparations: N. F.—Elixir Calcii Bromidi, Syrupus Bromidorum.

CALCII CARBONAS PRÆCIPITATUS, U. S. P. IX.

Calc. Carb. Præc.

Precipitated Calcium Carbonate, Precipitated Chalk. Official in European pharmacopœias as Calcium Carbonicum Præcipitatum (E), Carbonas Calcicus Præcipitatus (S). Contains, when dried, not less than 98 per cent of CaCO_3 . Tests for soluble impurities and a method of assay.

Average dose: 1 gm. or 15 grains.

Preparation: U. S. P.—Used in making Syrupus Calcii Lactophosphatis.

N. F.—Used in making: Elixir Lactophosphatis, Liquor Phosphatum Acidus, Liquor Phosphatum Compositus, Syrupus Calcii Iodidi, Unguentum Sulphuris Compositum.

CALCII CHLORIDUM, U. S. P. IX.

Calc. Chlor.

Calcium Chloride. Now contains not less than 75 per cent of CaCl_2 . Tests for contaminations and a method of assay.

Average dose: 0.5 gm. or 8 grains.

Preparation: N. F.—Liquor Hydrastinæ Compositus.

CALCII GLYCEROPHOSPHAS, U. S. P. IX. New. Calc. Glycerophos.

Calcium Glycerophosphate. Contains, when dried, not less than 98 per cent of $\text{CaC}_2\text{H}_3\text{O}_6\text{P}$. Tests for contaminations and a method of assay.

Average dose: 0.25 gm. or 4 grains.

Preparations: N. F.—Elixir Calcii et Sodii Glycerophosphatum
Elixir Glycerophosphatum Compositum.

CALCII HYPOPHOSPHIS, U. S. P. IX.

Calc. Hypophos.

Calcium Hypophosphite. Official in European pharmacopœias as Calcium Hypophosphorosum (E), Hypophosphis Calcicus (S). Contains, when dried, not less than 98 per cent of $\text{Ca}(\text{PH}_2\text{O}_2)_2$. Tests for contaminations and a method of assay, based on the oxidation of hypophosphite to phosphate.

Average dose: 0.5 gm. or 8 grains.

Preparations: U. S. P.—Syrupus Hypophosphitum.

N. F.—Elixir Calcii Hypophosphitis, Elixir Cinchonæ Alkaloidarum et Hypophosphitum, Elixir Hypophosphitum, Elixir Hypophosphitum cum Ferro. Emulsum Olei Morrhuæ cum Hypophosphitibus, Liquor Hypophosphitum, Liquor Hypophosphitum Compositus, Syrupus Calcii et Sodii Hypophosphitum, Syrupus Calcii Hypophosphitis, Syrupus Hypophosphitum Compositus.

CALCII LACTAS, U. S. P. IX. New.

Calc. Lact.

Calcium Lactate. A hydrated form of calcium lactate. Contains, when dried, not less than 98 per cent of $\text{Ca}(\text{C}_2\text{H}_3\text{O}_2)_2$. Tests for contaminations and a method of assay.

Average dose: 0.5 gm. or 8 grains.

CALCII LACTOPHOSPHAS, N. F. IV. Part II.

Calc. Lactophos.

Calcium Lactophosphate. A variable mixture of calcium lactate, calcium acid lactate, and calcium acid phosphate. Tests for identity and purity.

Average dose: 0.5 gm. or 8 grains.

Preparation: N. F.—Emulsum Olei Morrhuæ cum Calcii Lactophosphatis.

CALCII PHOSPHAS PRÆCIPITATUS, N. F. IV. Part II.

Calc. Phos. Præc.

Precipitated Calcium Phosphate. Official in European pharmacopœias as Calcium Phosphoricum (E). Contains, when dried, not less than 96 per cent of $\text{Ca}_3(\text{PO}_4)_2$. Tests for identity and purity and a method of assay.

Average dose: 1 gm. or 15 grains.

Preparations: N. F.—Emulsum Olei Morrhuæ cum Calcii Phosphate, Pulvis Antimonialis, Syrupus Calcii Hydrochlorphosphatis.

CALCII SULPHAS EXSICCATUS, U. S. P. VIII. Deleted.

CALCII SULPHIDUM CRUDUM, U. S. P. IX.

Calc. Sulphid. Crud.

Crude Calcium Sulphide, Calx Sulphurate, U. S. P. VIII, Sulphurated Lime. Contains not less than 55 per cent of CaS . Tests for identity and a method of assay.

Average dose: 0.06 gm. or 1 grain.

CALENDULA, N. F. IV. Part II From U. S. P. VIII. Calend.

Calendula, Marigold. The dried ligulate florets of *Calendula officinalis* Linné, without admixture of more than 2 per cent of other parts of the plant or of foreign matter. Contains not more than 11 per cent of ash.

Preparations: N. F.—Fluidextractum Calendulæ, Tinctura Calendulæ.

CALUMBA, U. S. P. IX. Calumb.

Calumba, Columba, Columbo, Colombo. Official in European pharmacopœias as Radix Colombo (E). The dried root of *Jateorhiza palmata* Miers. Contains not less than 8 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparation: U. S. P.—Tinctura Calumbæ.

N. F.—Fluidextractum Calumbæ.

CALX, U. S. P. IX. Calx.

Calcium Oxide, Lime, Quicklime. Official in European pharmacopœias as Calcaria Usta (E), Oxydum Calcicum (S). Contains when dried not less than 95 per cent of CaO. Loses not more than 10 per cent of its weight on ignition. Tests for hydroxide, carbonate and volatile substances and a method of assay.

Preparations: U. S. P.—Liquor Calcis.

N. F.—Used in making: Fluidglyceratum Cascaræ Sagradæ Aromaticum, Liquor Calcis Sulphuratæ, Potassa cum Calce, Soda cum Calce.

CALX CHLORINATA, U. S. P. IX. Calx. Chlorin.

Chlorinated Lime, Chloride of Lime, Chlorinated Calcium Oxide. Official in European pharmacopœias as Calcaria Chlorata (E), Calx Chlorata (S). Contains not less than 30 per cent of available chlorine. Method of assay.

Preparation: U. S. P.—Used in making: Liquor Sodæ Chlorinatæ.

N. F.—Used in making: Liquor Potassæ Chlorinatæ.

CALX SULPHURATA, U. S. P. VIII. See Calcii Sulphidum Crudum, U. S. P. IX.

CAMBOGIA, U. S. P. IX. Cambog.

Gamboge, Pipe Gamboge. A gum-resin obtained from *Garcinia hanburii* Hooker. Tests for starch. Gamboge is 65 per cent soluble in alcohol and yields not more than 2 per cent of ash.

Average dose: 0.125 gm. or 2 grains.

Preparations: U. S. P.—Pilulæ Catharticæ Compositæ.

CAMPORA, U. S. P. IX. Camph.

Camphor. A ketone obtained from *Cinnamomum camphora* Ness et Ebermaier. It is dextrogyrate. Tests for moisture and chlorinated products. It sublimes without leaving more than 0.05 per cent of ash.

Average dose: By mouth, 0.2 gm. or 3 grains; hypodermic, 0.1 gm. or 1½ grains.

Preparations: U. S. P.—Aqua Camphoræ, Linimentum Belladonnæ, Linimentum Camphoræ, Linimentum Saponis (which see), Spiritus Camphoræ, Tinctura Opii Camphorata.

N. F.—Ceratum Camphoræ, Ceratum Plumbi Subacetatis, Chloral Camphoratum, Emplastrum Fuscum Camphoratum, Linimentum Ammonii Iodidi, Linimentum Opii Compositum, Linimentum Saponato-Camphoratum, Linimentum Sinapis Compositum, Menthol Camphoratum, Nebula Aromatica, Nebula Mentholis Compositus, Petroxolinum Phenolis Camphoratum, Pilulæ Antiperiodicæ, Pilulæ Antiperiodicæ sine Aloe, Pilulæ Opii et Camphoræ, Tinctura Antiperiodica, Tinctura Antiperiodica sine Aloe, Unguentum Camphoræ.

CAMPHORA MONOBROMATA, U. S. P. IX. Camph. Monobrom.

Monobromated Camphor. Ortho-monobrom-camphor, $C_{10}H_{15}OBr$. Melts between 74° and 76°. On incineration leaves not more than 0.05 per cent of ash.

Average dose: 0.125 gm. or 2 grains.

CAMPHOR-MENTHOL, N. F. III. See Menthol Camphoratum, N. F. IV.

CANELLA, N. F. IV. Part II. Canell.

Canella. The dried bark of *Canella winterana* Gærtner. Contains not more than 7 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparation: N. F.—Pulvis Aloes et Canellæ.

CANNABIS, U. S. P. IX. Cannab.

Cannabis, Guaza, Ganjah. The dried flowering tops of the pistillate plants of *Cannabis sativa* Linné or of the variety *indica* Lamarck, freed from the thicker stems and large foliage leaves and without admixture of more than 10 per cent of fruits. Yields not more than 15 per cent of ash. Made into a fluid extract and administered to dogs produces incoordination in a dose of not more than 0.03 mil per kilogram of body weight of the animal.

Preparations: U. S. P.—Extractum Cannabis (which see), Fluid-extractum Cannabis, Tinctura Cannabis.

CANNABIS INDICA, U. S. P. VIII. See Cannabis, U. S. P. IX.

CANTHARIS, U. S. P. IX. Canthar.

Cantharides, Spanish Flies, Russian Flies. The dried beetle, *Cantharis vesicatoria* De Geer, yielding not less than 0.6 per cent of cantharidin. Method of assay. Cantharides with an ammonia odor must not be used.

Preparations: U. S. P.—Ceratum Cantharidis, Collodium Cantharidatum, Tinctura Cantharidis.

CAPSICUM, U. S. P. IX.

Capsic.

Capsicum, Cayenne Pepper, African Chillies. Official in European pharmacopœias as *Fructus Capsici* (E). The dried ripe fruits of *Capsicum frutescens* Linné without admixture of more than 2 per cent of stems and other foreign matter. Yields not less than 15 per cent of nonvolatile extractive soluble in ether and not more than 7 per cent of ash. The ash insoluble in HCl does not exceed 1 per cent of the weight of capsicum taken.

Average dose: 0.06 gm. or 1 grain.

Preparations: U. S. P.—*Oleoresina Capsici*, *Tinctura Capsici*.

N. F.—*Pulvis Aromaticus Rubefaciens*, *Pulvis Myricæ Compositus*, *Tinctura Capsici et Myrrhæ*.

CAMEL, N. F. IV. Part II.

Caram.

Caramel, Saccharatum Ustum, Burnt Sugar Coloring. A concentrated aqueous solution of the product obtained by heating sugar or glucose until the sweet taste is destroyed and a uniform dark brown mass results, a small amount of alkali or alkali carbonate being added before heating. Tests for identity and purity. Yields not more than 8 per cent of ash.

Preparations: N. F.—*Tinctura Caramellis*, *Tinctura Pectoralis*, *Tinctura Persionis Composita*. Used as a coloring.

CARBO ANIMALIS, U. S. P. VIII. Deleted.

CARBO ANIMALIS PURIFICATUS, U. S. P. VIII. Deleted.

CARBO LIGNI, U. S. P. IX.

Carbo. Lig.

Wood Charcoal, Charcoal. Official in European pharmacopœias as *Carbo Ligni Pulveratus* (E). Prepared from soft wood and very finely powdered. Burns without a luminous flame and leaves not more than 7.5 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparation: N. F.—*Trochisci Carbonis Ligni*.

CARBONEI DISULPHIDUM, U. S. P. VIII. Deleted.

CARDAMOMI SEMEN, U. S. P. IX.

Cardam. Sem.

Cardamom Seed, Cardamomum, U. S. P. VIII. Official in European pharmacopœias as *Fructus Cardamomi* (E). The dried seeds of *Elettaria cardamomum* White et Maton, recently removed from the capsules. Yields not more than 8 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparations: U. S. P.—*Extractum Colocyntidis Compositum*, *Pulvis Aromaticus*, *Tinctura Cardamomi*, *Tinctura Cardamomi Composita*, *Tinctura Gentianæ Composita*, *Tinctura Rhei*.

N. F.—*Pulvis Cretæ Aromaticus*, *Tinctura Aromatica*, *Tinctura Rhei Dulcis*.

CARDAMOMUM, U. S. P. VIII. See Cardamomi Semen, U. S. P. IX.

CARMIMUM, N. F. IV. Part II.

Carmin.

Carmin. The aluminum lake of the coloring principle obtained from cochineal. Tests for identity and purity.

Preparations: N. F.—Liquor Carmini, Trochisci Phenolphthaleini.

CARUM, U. S. P. IX.

Carum.

Caraway, Caraway seed. Official in European pharmacopœias as *Fructus Carvi* (E). The dried fruits of *Carum Carvi* Linné. Yields not more than 8 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparations: U. S. P.—Tinctura Cardamomi Composita. See also Oleum Cari.

CARYOPHYLLUS, U. S. P. IX.

Caryoph.

Clove, Cloves. Official in European pharmacopœias as *Caryophylli* (E). The dried flower buds of *Eugenia aromatica*, O. Kuntze, without admixture of more than 5 per cent of the peduncles, stems, and other foreign matter. Contains not more than 8 per cent of ash. Ash insoluble in HCl does not exceed 0.5 per cent of the weight of clove taken.

Average dose: 0.25 gm. or 4 grains.

Preparations: U. S. P.—Tinctura Lavendulæ Composita, Tinctura Rhei Aromatica.

N. F.—Cordiale Rubi Fructus, Elixir Rubi Compositum, Pulvis Aromaticus Rubefaciens, Pulvis Cretæ Aromaticus, Pulvis Myricæ Compositus, Syrupus Sennæ Aromaticus, Tinctura Aromatica, Tinctura Opii Crocata, Tinctura Viburni Opuli Composita. See also Oleum Caryophylli.

CASCARA SAGRADA, U. S. P. IX.

Casc. Sagr.

Cascara Sagrada, Rhamnus Purshiana, U. S. P. VIII. Official in European pharmacopœias as *Cortex Rhamni Purshianæ* (E). The dried bark of the trunk and branches of *Rhamnus Purshiana* de Candolle.

Average dose: 1 gm. or 15 grains.

Preparations: U. S. P.—Extractum Cascaræ Sagradæ, Fluidextractum Cascaræ Sagradæ, Fluidextractum Cascaræ Sagradæ Aromaticum.

N. F.—Fluidglyceratum Cascaræ Sagradæ, Fluidglyceratum Cascaræ Sagradæ Aromaticum.

CASCARILLA, N. F. IV. Part II.

Cascarill.

Cascarilla, Sweetwood Bark, Sweet Bark. The dried bark of *Croton Eluteria* Bennett without admixture of more than 5 per cent of adhering wood. Yields not more than 10 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparation: N. F.—Vinum Aurantii Compositum.

CASSIA FISTULA, N. F. IV. Part II. From U. S. P. VIII.

Cass. Fist.

Cassia fistula. The dried fruit of *Cathartocarpus fistula* Linné.

Average dose: 4 gm. or 60 grains.

Preparation: N. F.—Confectio Sennæ.

CASTANEA, N. F. IV. Part II.

Castan.

Castanea, Chestnut Leaves. The dried leaves of *Castanea dentata*, Borkhausen, collected in September or October while still green and without admixture of more than 5 per cent of twigs and other foreign matter.

Average dose: 4 gm. or 1 drachm.

Preparation: N. F.—Fluidextractum Castanæ

CATAPLASMA KAOLINI, N. F. IV. From U. S. P. VIII.

Catapl. Kaolin.

Cataplasm of Kaolin. Now a mixture of kaolin (56.5) and glycerin (38.7) with boric acid (4.5) and small quantities of thymol, methyl salicylate and oil of peppermint.

CATARIA, N. F. IV. Part II.

Catar.

Catnep. Catmint, Catnip, Nepeta. The dried leaves and flowering tops of *Nepeta cataria* Linné. Yields not more than 16 per cent of ash.

Average dose: 4 gm. or 1 drachm.

Preparation: N. F.—Fluidextractum Cataris.

CAULOPHYLLUM, N. F. IV. Part II.

Caulophyll.

Caulophyllum, Blue Cohosh, Papoose Root, Squaw Root. The dried rhizome and roots of *Caulophyllum thalictroides* Michaux. Yields not more than 6 per cent of ash.

Average dose: 0.5 gm. or 8 grains.

Preparation: N. F.—Fluidextractum Caulophylli.

CENTAURIUM, N. F. IV. Part II.

Centaur.

Centaury. The dried flowering plant of *Erythraea centaurium* Persoon. Yields not more than 5 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparation: N. F.—Tinctura Amara.

CERA ALBA, U. S. P. IX.

Cer. Alb.

White Wax. Yellow wax bleached. Melts between 62 and 65°. Acid value from 17 to 23. Ester value from 72 to 79.

Preparations: U. S. P.—Used in making: Ceratum, Ceratum Camphoræ, Unguentum, Unguentum Aquæ Rosæ.

N. F.—Petroxolinum Spissum, Unguentum Camphoræ.

CERA FLAVA, U. S. P. IX.

Cer. Flav.

Yellow Wax, Beeswax. Obtained by melting and purifying the honey-comb of the bee *Apis mellifera* Linné. Melts between 62 and

65°. Acid value from 18 to 24. Ester value from 72 to 77. Should be free from fats or fatty acids, Japan wax, or rosin.

Preparations: U. S. P.—*Ceratum Cantharidis*; *Ceratum Resinæ*, *Emplastrum Resinæ Unguentum Picis Liquidæ*.

N. F.—*Ceratum Resinæ Compositum*, *Emplastrum Fuscum Camphoratum*, *Mulla Creosoti Salicylata*, *Unguentum Picis Compositum*, *Unguentum Resorcinolis Compositum*.

CERATUM, U. S. P. IX.

Cerat.

Cerate, Simple Cerate. A mixture of white wax (30) and benzoinated lard (70).

CERATUM CAMPHORÆ, N. F. IV. From U. S. P. VIII.

Cerat. Camph.

Camphor Cerate. A mixture of camphor liniment (10) white wax (35), white petrolatum (15) and benzoinated lard (40).

CERATUM CAMPHORÆ COMPOSITUM, N. F. III. Deleted.

CERATUM CANTHARIDIS, U. S. P. IX.

Cerat. Canthar.

Cantharides Cerate, Blistering Cerate. Official in European pharmacopœias as *Ceratum Cantharidis* (E). Cantharides (35) macerated with a mixture of glacial acetic acid (2.5), and oil of turpentine (15); then mixed with yellow wax (17.5) rosin (17.5) and benzoinated lard (to make 100).

CERATUM CETACEI, N. F. III. Deleted.

CERATUM EXTRACTI CANTHARIDIS, N. F. III. Deleted.

CERATUM PLUMBI SUBACETATIS, N. F. IV. From U. S. P. VIII.

Cerat. Plumb. Subacet.

Cerate of Lead Subacetate, Goulard's Cerate. A mixture of lead subacetate (20), wool fat (20) white wax (20), camphor and white petrolatum (to make 100).

CERATUM RESINÆ, U. S. P. IX.

Cerat. Res.

Rosin Cerate, Basilicon Ointment. A mixture of rosin (35), yellow wax (15) and lard (to make 100).

Preparation: U. S. P.—*Linimentum Terebinthinæ*.

CERATUM RESINÆ COMPOSITUM, N. F. IV. From U. S. P. VIII.

Cerat. Resin. Co.

Compound Rosin Cerate also known as Deshler's Salve. A mixture of rosin (22.5), yellow wax (22.5), prepared suet (30) turpentine (11.5) and linseed oil (to make 100).

CERATUM SABINÆ, N. F. III. Deleted.

CEREVISIÆ FERMENTUM COMPRESSUM, N. F. IV. Part II.

Cerev. Ferm. Compr.

Compressed Yeast. Soft and easily broken masses, having a characteristic, slightly sour odor and not more than a faintly acid

reaction to litmus. Must not be used unless fresh and free from mildew and musty or foul odors.

Preparation: N. F.—Lac Fermentum.

CERII OXALAS, U. S. P. IX.

Cerii Oxal.

Cerium Oxalate. A mixture of oxalates of cerium, didymium, Lanthanum, and other associated elements.

Average dose: 0.2 gm. or 3 grains.

CETACEUM, U. S. P. IX.

Cetac.

Spermaceti. A concrete, fatty substance, obtained from the head of the sperm whale, *Physeter macrocephalus*, Linné.

Preparation: U. S. P.—Used in making Unguentum Aquæ Rosæ.

CHARTA CANTHARIDIS, N. F. III. Deleted.

CHARTA POTASSII NITRATIS, N. F. IV.

Chart. Pot. Nit.

Potassium Nitrate Paper, White unsized paper, saturated with a solution of potassium nitrate and dried.

CHARTA SINAPIS, U. S. P. VIII. See Emplastrum Sinapis, U. S. P. IX.

CHIMAPHILA, N. F. IV. Part II. From U. S. P. VIII. Chimaph.

Chimaphila, Pipsissewa. The dried leaves of *Chimaphila umbellata* Barton without admixture of more than 5 per cent of stems or other foreign matter. Yields not more than 7 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparations: N. F.—Fluidextractum Chimaphilæ. Fluidextractum Stillingiæ Compositum.

CHIONANTHUS, N. F. IV. Part II.

Chionant.

Chionanthus, Fringe Tree Bark. The dried bark of the root of *Chionanthus virginica* Linné without admixture of more than 8 per cent of other parts of the plant or foreign matter. Yields not more than 5 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparation: N. F.—Fluidextractum Chionanthi.

CHIRATA, N. F. IV. Part II. From U. S. P. VIII.

Chirat.

Chirata. The dried plant of *Swertia chirayita* Hamilton. Yields not more than 6 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparation: N. F.—Fluidextractum Chiratæ.

CHLORAL CAMPHORATUM, N. F. IV.

Chloral. Camph.

Camphorated Chloral, Chloral and Camphor. A mixture of hydrated chloral (50) and camphor (50).

CHLORALFORMAMIDUM, U. S. P. VIII. Deleted.

CHLORALUM HYDRATUM, U. S. P. IX.

Chloral Hydrat.

Hydrated Chloral, Chloral, Chloral Hydrate. Official in European pharmacopœias as Chloralum Hydratum (E), Hydras Chloralicus (S). A compound of trichloraldehyde or chloral, with the elements of one molecule of water. Contains not less than 99.5 per cent of $C_2HCl_3O + H_2O$. Hydrated chloral is not hygroscopic and on incineration leaves not more than 0.05 per cent of ash. Tests for hydrochloric acid, chlorides, and organic impurities and a method of assay.

Average dose: 0.5 gm. or 8 grains.

Preparations: N. F.—Chloral Camphoratum, Mistura Chlorali et Potassii Bromidi Composita.

CHLOROFORMUM, U. S. P. IX.

Chlorof.

Chloroform. Official in European pharmacopœias as Chloroformium (E). Contains from 99 to 99.4 per cent of $CHCl_3$, and from 0.6 to 1 per cent of alcohol. Specific gravity 1.474 to 1.478 at 25°. Tests for free chlorine and other impurities.

Average dose: 0.3 mil or 5 minims.

Preparations: U. S. P.—Aqua Chloroformi, Linimentum Chloroformi, Spiritus Chloroformi.

N. F.—Elixir Ammonii Valeratis, Elixir Phosphori, Linimentum Aconiti et Chloroformi, Liquor Gutta-Perchæ, Liquor Pancreaticus, Mistura Chloroformi et Morphinae Composita, Mistura Olei Picis, Mistura Opii et Chloroformi Composita, Petroxolinum Chloroformi Camphoratum, Syrupus Pini Strobi Compositus cum Morphina, Syrupus Pini Strobi Compositus sine Morphina, Trochisci Quininæ Tannatis.

CHONDRUS, U. S. P. IX.

Chondrus, Irish Moss, Carageen. Official in European pharmacopœias as Carrageen (E). The dried plant of *Chondrus crispus* Stackhouse and *Gigartina Mamillosa* J. Agardh.

Preparations: N. F.—Gelatinum Chondri, Mucilage Chondri.

CHROMII TRIOXIDUM, U. S. P. IX.

Chrom. Triox.

Chromium Trioxide, Chromic Acid, Chromic Anhydride. Official in European pharmacopœias as Acidum Chromicum (E). Contains not less than 95 per cent of CrO_3 . Tests for impurities and a method of assay.

CHRYSAROBINUM, U. S. P. IX.

Chrysarob.

Chrysarobin. A mixture of neutral principles extracted from Goa Powder, a substance found deposited in the woud of *Vouacoua Araroba* Druce.

Average dose: 0.03 gm. or $\frac{1}{2}$ grain.

Preparation: U. S. P.—Unguentum Chrysarobini.

CIMICIFUGA, U. S. P. IX.

Cimicif.

Cimicifuga, Black Cohosh, Black Snakeroot, Macrotys. The dried rhizome and roots of *Cimicifuga racemosa* Nuttall, without admixture of more than 2 per cent of stems and foreign matter. Yields not more than 10 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparations: U. S. P.—Extractum Cimicifugæ, Fluidextractum Cimicifugæ.

N. F.—Tinctura Cimicifugæ.

CINCHONA, U. S. P. IX.

Cinch.

Cinchona, Yellow Cinchona, Calisaya Bark, Yellow Peruvian Bark. Official in European pharmacopœias as Cortex Chinæ (E). The dried bark of *Cinchona Ledgeriana* Moens, *Cinchona Calisaya* Weddell, and of hybrids of these with other species of Cinchona. Yields not less than 5 per cent of the alkaloids of Cinchona. Qualitative tests and a method of assay.

Average dose: 1 gm. or 15 grains.

Preparations: U. S. P.—Fluidextractum Cinchonæ, Tinctura Cinchonæ.

N. F.—Extractum Cinchonæ, Infusum Cinchonæ.

CINCHONA RUBRA, U. S. P. IX.

Cinch. Rub.

Red Cinchona, Red Peruvian Bark. The dried bark of *Cinchona succirubra* Pavon or of its hybrids. Yields not less than 5 per cent of the alkaloids of red cinchona. Method of assay.

Average dose: 1 gm. or 15 grains.

Preparations:

U. S. P.—Tinctura Cinchonæ Composita.

N. F.—Fluidextractum Cinchonæ Aquosum.

CINCHONIDINÆ SULPHAS, U. S. P. IX.

Cinchonid. Sulph.

Cinchonidine Sulphate. The sulphate $(C_{19}H_{22}N_2O)_2 \cdot H_2SO_4 + 3H_2O$ of an alkaloid obtained from the bark of several species of cinchona. Tests for impurities.

Average dose: 0.15 gm. or 2½ grains.

Preparation: N. F.—Elixir Cinchonæ Alkaloidarum (which see).

CINCHONINÆ SULPHAS, U. S. P. IX.

Cinchonin. Sulph.

Cinchonine Sulphate. The sulphate $(C_{19}H_{22}N_2O)_2 \cdot H_2SO_4 + 2H_2O$ of an alkaloid obtained from the bark of several species of cinchona. When dried to constant weight at 100° loses not more than 0.5 per cent. On incineration not more than 0.1 per cent of ash remains. Tests for impurities.

Average dose: 0.15 gm. or 2½ grains.

Preparation: N. F.—Elixir Cinchonæ Alkaloidarum (which see).

CINNALDEHYDUM, U. S. P. VIII. Deleted.

CINNAMOMUM SAIGONICUM, U. S. P. IX.

Cinnam. Saigon.

Saigon Cinnamon. Official in European pharmacopœias as *Cortex Cinnamomi* (E). The dried bark of an undetermined species of *Cinnamomum*. Yields not more than 6 per cent of ash. The amount of ash insoluble in diluted hydrochloric acid does not exceed 2 per cent of the weight of the drug. Saigon cinnamon yields not less than 2 per cent of volatile extractive, soluble in ether.

Average dose: 0.25 gm. or 4 grains.

Preparations: U. S. P.—*Pulvis Aromaticus*, *Tinctura Cardamomi Composita*, *Tinctura Cinnamomi*, *Tinctura Gambir Composita*, *Tinctura Lavendulæ Composita*, *Tinctura Rhei Aromatica*.

N. F.—*Cordiale Rubi Fructus*, *Elixir Rubi Compositum*, *Pulvis Aromaticum Rubefaciens*, *Pulvis Cretæ Aromaticus*, *Pulvis Gambir Compositus*, *Pulvis Kino et Opii Compositus*, *Syrupus Cinnamomi*, *Syrupus Sennæ Aromaticus*, *Tinctura Antiperiodica*, *Tinctura Antiperiodica sine Aloe*, *Tinctura Aromatica*, *Tinctura Opii Crocata*, *Tinctura Viburni Opuli Composita*, *Vinum Aurantii Compositum*. (See also under *Oleum Cassiæ*.)

CINNAMOMUM ZEYLANICUM, U. S. P. IX.

Cinnam. Zeylan.

Ceylon Cinnamon. Official in European pharmacopœias as *Cortex Cinnamomi Ceylanici* (E). The dried bark of cultivated trees of *Cinnamomum zeylanicum* Breyne. Yields not less than 0.5 per cent of volatile extractive, soluble in ether and not more than 6 per cent of ash. The amount of ash insoluble in diluted hydrochloric acid does not exceed 2 per cent of weight of the drug.

Average dose: 0.25 gm. or 4 grains.

COCA, U. S. P. VIII. Deleted.

COCAINE, U. S. P. IX.

Cocain.

Cocaine. An alkaloid ($C_{17}H_{21}NO_4$) obtained from *Erythroxylon coca* Lamarck and its varieties. Melts between 96 and 98°.

Average dose: 0.015 gm. or $\frac{1}{4}$ grain.

Preparation: N. F.—*Oleatum Cocainæ*.

COCAINÆ HYDROCHLORIDUM, U. S. P. IX.

Cocain. Hydrochl.

Cocaine Hydrochloride, Cocaine Chloride. Included in the International Protocol as *Cocainum Hydrochloricum* (P. I.). Official in European pharmacopœias as *Chloretum Cocainum* (S). The hydrochloride ($C_{17}H_{21}NO_4 \cdot HCl$) of the alkaloid cocaine. Melts between 183 and 191°. On incineration no weighable ash remains. Tests for impurities.

Average dose: 0.15 gm. or $\frac{1}{4}$ grain.

COCCULUS INDICUS, N. F. IV. Part II.

Coccul. Ind.

Cocculus Indicus, Fish Berry, Indian Berry. The dried fruit of *Anamirta Cocculus* Wight et Arnott. Yields not more than 5 per cent of ash.

Preparation: N. F.—*Tinctura Cocculi Indici*.

Coccus, U. S. P. IX.

Cochineal. Official in European pharmacopœias as *Coccionella* (S). The dried female of the insect *Coccus Cacti* enclosing the young larvæ. Yields not more than 6 per cent of ash.

Preparations: U. S. P.—*Tinctura Cardamomi Composita*.

N. F.—*Liquor Coccini*, *Syrupus Asari Compositus*, *Tinctura Kino et Opii Composita*.

Cocillana, N. F. IV. Part II.

Cocillan.

Cocillana. The dried bark of *Guarea Rusbyi* Rusby. Yields not more than 10 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparation: N. F.—*Fluidextractum Cocillanæ*.

CODEINA, U. S. P. IX.

Codein.

Codeine, Methyl Morphine. Official in European pharmacopœias as *Codeinum* (E). An alkaloid ($C_{18}H_{21}NO_3 + H_2O$) obtained from opium or prepared from morphine by methylation.* When rendered anhydrous melts between 154° and 156° . Tests for impurities.

Average dose: 0.03 gm. or $\frac{1}{2}$ grain.

Preparation: N. F.—*Elixir Terpini Hydratis et Codeinæ*.

CODEINÆ PHOSPHAS, U. S. P. IX.

Codein. Phos.

Codeine Phosphate. Official in European pharmacopœias as *Codeinum Phosphoricum* (E), *Phosphas Codeicus* (S). The phosphate ($C_{18}H_{21}NO_3 \cdot H_2PO_4 + 2H_2O$) of the alkaloid codeine. Yields not less than 67 per cent of anhydrous codeine. Tests for impurities and a method of assay.

Average dose: 0.03 gm. or $\frac{1}{2}$ grain.

CODEINÆ SULPHAS, U. S. P. IX.

Codein. Sulph.

Codeine Sulphate. The sulphate ($C_{18}H_{21}NO_3 \cdot H_2SO_4 + H_2O$) of the alkaloid codeine. When dried at 100° loses not more than 12 per cent of moisture.

Average dose: 0.03 gm. or $\frac{1}{2}$ grain.

Preparation: N. F.—*Syrupus Codeinæ*.

COFFEA TOSTA, N. F. IV. Part II.

Coff. Tost.

Coffee, Roasted Coffee. The dried ripe seeds of *Coffea Arabica* Linné or *Coffea Liberica* Bulliard roasted until they develop a dark brown color and a characteristic aroma; yields not less than 1 per cent of caffeine and not less than 3 nor more than 5 per cent of ash. Method of assay.

Preparation: N. F.—*Fluidextractum Coffeæ*.

COLCHICI CORMUS, U. S. P. IX.

Colch, Corm.

Colchicum Corm, Colchicum Root. The dried corm of *Colchicum autumnale* Linné. Yields not less than 0.35 per cent of colchicine. Method of assay.

Average dose: 0.25 gm. or 4 grains.

Preparation: U. S. P.—*Extractum Colchici Cormi*.

N. F.—*Fluidextractum Colchici Cormi*, *Vinum Colchici Cormi*.

COLCHICI SEMEN, U. S. P. IX.

Colch. Sem.

Colchicum Seed. Included in the International Protocol as *Semen Colchici* (P. I.). The dried seeds of *Colchicum autumnale* Linné. Yields not less than 0.45 per cent of colchicine and not more than 8 per cent of ash. Method of assay.

Average dose: 0.2 gm. or 3 grains.

Preparations: U. S. P.—*Fluidextractum Colchici Seminis* (which see), *Tinctura Colchici Seminis*.

COLCHICINA, U. S. P. IX.

Colchicin.

Colchicine. An alkaloid ($C_{23}H_{25}NO_6$) obtained from colchicum. Melts between 142° and 146°. Tests for identity and purity including a test for chloroform of crystallization.

Average dose: 0.0005 gm. or $\frac{1}{120}$ grain.

COLLODIUM, U. S. P. IX.

Collod.

Collodion. A solution of pyroxylin (4), in a mixture of ether (75) and alcohol (25).

Preparation: U. S. P.—*Collodium Flexile* (which see).

N. F.—*Collodium Stypticum*.

COLLODIUM CANTHARIDATUM, U. S. P. IX.

Collod. Canthar.

Cantharidal Collodion, *Blistering Collodion*, *Vesicating Collodium*. Official in European pharmacopœias as *Collodium Vesicans* (E). *Cantharides* extracted with a mixture of glacial acetic acid (5) and acetone, and the resulting extract mixed with flexible collodion (85) (to make 100).

COLLODIUM FLEXILE, U. S. P. IX.

Collod. Flex.

Flexible Collodion. Official in European pharmacopœias as *Collodium Elasticum* (E). A mixture of collodion (95), camphor (2), and castor oil (3).

Preparation: U. S. P.—*Collodium Cantharidatum*.

N. F.—*Collodium Iodi*, *Collodium Iodoformi*, *Collodium Tiglli*, *Collodium Salicyli Compositum*.

COLLODIUM IODATUM, N. F. III. See *Collodium Iodi*, N. F.

COLLODIUM IODI, N. F. IV.

Collod. Iodi.

Iodine Collodion. A solution of iodine (5), in flexible collodion (to make 100).

COLLODIUM IODOFORMATUM, N. F. III. See *Collodium Iodoformi*, N. F. IV.

COLLODIUM IODOFORMI, N. F. IV.

Collod. Iodof.

Iodoform Collodion. A solution of Iodoform (5) in flexible collodion (to make 100).

COLLODIUM SALICYLATUM COMPOSITUM, N. F. III. See **Collodium Salicylici Compositum**, N. F. IV.

COLLODIUM SALICYLI COMPOSITUM, N. F. IV. **Collod. Salicyl. Co.**
Compound Salicylic Acid Collodion. Now a solution of salicylic acid (11) with fluidextract of cannabis (now 10) in flexible collodion (to make 100).

COLLODIUM STYPTICUM, N. F. IV. From U. S. P. VIII.

Collod. Stypt.

Styptic Collodion. Now a solution of tannic acid (20) in flexible collodion (to make 100).

COLLODIUM TIGLII, N. F. IV.

Collod. Tiglii.

Croton Oil Collodion. A solution of croton oil (10) in flexible collodion (to make 100).

COLOCYNTHIS, U. S. P. IX.

Colocyn.

Colocynth, Bitter Apple, Colocynth Apple. Official in European pharmacopœias as *Fructus Colocynthis* (E). The dried pulp of the fruit of *Citrullus Colocynthis* Schrader without admixture of more than 5 per cent of seeds nor more than 2 per cent of epicarp. Yields not more than 15 per cent of ash.

Average dose: 0.06 gm. or 1 grain.

Preparation: U. S. P.—*Extractum Colocynthis* (which see).

CONDURANGO, N. F. IV. Part II.

Conduran.

Condurango. The dried bark of *Marsdenia Condurango* Reichenbach filius. Yields not more than 12 per cent of ash.

Average dose: 4 gm. or 1 drachm.

Preparation: N. F.—*Fluidextractum Condurango*.

CONFECTIO ROSÆ, N. F. IV. From U. S. P. VIII.

Confect. Ros.

Confection of rose. A mixture of red rose, sugar, clarified honey, and stronger rose water to make a mass.

CONFECTIO SENNÆ, N. F. IV. From U. S. P. VIII.

Confect. Senn.

Confection of Senna. A mixture of senna, cassia fistula, tamarind, prune, fig, sugar, oil of coriander, and water to make a mass.

Average dose: 4 gm. or 60 grains.

CONIUM, N. F. IV. Part II. From U. S. P. VIII.

Conium.

Conium, Poison Hemlock. The full grown but unripe fruit of *Conium maculatum* Linné. Yields not less than 0.5 per cent of coniine and not more than 8 per cent of ash. Method of assay.

Average dose: 0.2 gm. or 3 grains.

Preparations: N. F.—*Extractum Conii*, *Fluidextractum Conii*.

CONVALLARIA, U. S. P. VIII. See *Convallariæ Radix*, N. F. IV.

CONVALLARIÆ FLORES, N. F. IV. Part II. Convallar. Flor.

Convallaria Flowers, Lily-of-the-Valley Flowers. The dried inflorescence of *Convallaria majalis* Linné without admixture of more than 5 per cent of foreign matter. Yields not more than 12 per cent of ash.

Average dose: 0.5 gm. or 8 grains.

Preparation: N. F.—Fluidextractum Convallariz Florum.

CONVALLARIÆ RADIX, N. F. IV. Part II. From U. S. P. VIII. Convallar. Rad.

Convallaria Root, Convallaria U. S. P. VIII. Lily-of-the-Valley Root. The dried rhizome and roots of *Convallaria majalis* Linné. Contains not more than 10 per cent of ash.

Average dose: 0.5 gm. or 8 grains.

Preparation: N. F.—Fluidextractum Convallariz Radicis.

COPAIBA, U. S. P. IX. Copaib.

Copaiba, Balsam of Copaiba, Copaiwa. Official in European pharmacopœias as Balsamum Copaiwæ (E). An oleoresin derived from South American species of Copaiba. Specific gravity from 0.940 to 0.995 at 25°. Tests for paraffin or fatty oils, gurjun balsam, paraffin oils, and African Copaiba.

Average dose: 1 mil or 15 minims.

Preparations: N. F.—Massa Copaibæ, Mistura Copaibæ, Mistura Copaibæ et Opii.

COPTIS, N. F. IV. Part II. Coptis.

Coptis, Goldthread. The dried plant *Coptis trifolia*, Salisbury. Yields not more than 8 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparation: N. F.—Fluidextractum Coptis.

CORDIALE RUBI FRUCTUS, N. F. IV. Cord. Rubi Fruct.

Blackberry Cordial. Now a mixture of Saigon Cinnamon, cloves, and myristica, extracted with diluted alcohol (to make 25) and this percolate added to blackberry syrup (to make 100).

Average dose: 8 mils or 2 fluidrachms.

CORIANDRUM, U. S. P. IX. Coriand.

Coriander, Coriander Seed. Official in European Pharmacopœias as Fructus Coriandri., (E). The dried ripe fruits of *Coriandrum sativum* Linné, without admixture of more than 5 per cent of other fruits or foreign matter. Yields not less than 0.5 per cent of volatile extractive, soluble in ether, and not more than 7 per cent of ash.

Average dose: 0.5 gm. or 8 grains.

Preparations: N. F.—Fluidextractum Stillingiz Compositum, Infusum Gentianæ Compositum.

CORNUS, N. F. IV. Part II.

Corn.

Cornus, Dogwood Bark, Flowering Dogwood Bark. The dried root bark of *Cornus florida* Linné. Yields not more than 10 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparation: N. F.—Fluidextractum Corni.

CORYDALIS, N. F. IV. Part II.

Coryd.

Corydalis, Turkey Corn, Squirrel Corn. The dried tubers of *Bicuculla canadensis* Millspaugh, usually somewhat mixed with the dried bulb-like portions of *Bicuculla Cucullaria* Millspaugh, without admixture of more than 5 per cent of other parts of the plants or of foreign matter. Yields not more than 8 per cent of ash.

Average dose: 0.65 gm. or 10 grains.

Preparations: N. F.—Fluidextractum Corydalis, Fluidextractum Stillingiæ Compositum.

COTARNINÆ HYDROCHLORIDUM, U. S. P. IX. New.

Cotarn. Hydrochl.

Cotarnine Hydrochloride, Cotarnine Chloride. Quaternary oxymethyl-oxymethylene-dihydroisoquinoline chloride, obtained by hydrolyzing narcotine, and treating the resulting Cotarnine with hydrochloric acid. Melts between 142° and 144°.

Average dose: 0.06 gm. or 1 grain.

COUMARINUM, N. F. IV. Part II.

Coumar.

Coumarin. The anhydride, $C_6H_4(CH)_2OCO$, of ortho-oxycinnamic acid, occurring naturally in Tonka, Mellilot and other plants, or prepared synthetically. Tests for identity and purity.

Preparations: N. F.—Iodoformum Aromaticum, Oleum Ricini Aromaticum.

CREOSOTI CARBONAS, U. S. P. IX. New.

Creosot: Carb.

Creosote Carbonate. Also sold as Creosotal. A mixture of the carbonates of various constituents of creosote, chiefly guaiacol and creosol. Specific gravity from 1.145 to 1.170 at 25°. On incineration leaves not more than 0.1 per cent of ash.

Average dose: 1 gm. or 15 grains.

CREOSOTUM, U. S. P. IX.

Creosot.

Creosote, Creasote. Official in European pharmacopœias as Kreosotum (E). A mixture of phenols and phenol derivatives, chiefly guaiacol and creosol. Obtained during the distillation of wood tar. Specific gravity not below 1.078 at 25°. 80 per cent by volume distills between 200° and 220°.

Average dose: 0.25 mil or 4 minims.

Preparation: U. S. P.—Aqua Creosoti.

N. F.—Petroxolinum Creosoti, Mulla Creosoti Salicylicata.

CRESOL, U. S. P. IX.

Cresol. Official in European pharmacopœias as Cresolum Crudum (E). Kresolum Crudum (S). A mixture of isomeric cresols obtained from coal tar. Specific gravity from 1.030 to 1.038 at 25°. Not less than 90 v. per cent of cresol distills between 195° and 205°.

Average dose: 0.05 mil or 1 minim.

Preparation: U. S. P.—Liquor Cresolis Compositus.

CRETA PRÆPARATA, U. S. P. IX.

Cret. Præp.

Prepared Chalk; Drop Chalk. A native calcium carbonate freed from most of its impurities by elutriation and containing when dried not less than 97 per cent of CaCO_3 . Tests for impurities and a method of assay.

Average dose: 1 gm. or 15 grains.

Preparations: U. S. P.—Pulvis Cretæ Compositus (which see).

N. F.—Pulvis Cretæ Aromaticus.

CROCUS, N. F. IV. Part II.

Croc.

Crocus, Saffron. The stigmas of *Crocus sativus* Linné without the admixture of more than 10 per cent of the yellow styles and other harmless impurities. Yields not more than 7.5 per cent of ash.

Preparations: N. F.—Pilulæ Antiperiodicæ, Pilulæ Antiperiodicæ sine Aloe, Tinctura Antiperiodica, Tinctura Antiperiodica sine Aloe, Tinctura Croci, Tinctura Opii Crocata, Tinctura Zedoariæ Amara.

CUBEBA, U. S. P. IX.

Cubeb.

Cubeb, Cubebs. Official in European pharmacopœias as Fructus Cubebæ (E). The dried, full-grown fruits of *Piper Cubeba* Linné filius matter. admixture of more than 5 per cent of stems and other foreign without Yields not less than 10 per cent of a nonvolatile extractive, soluble in ether, and not more than 8 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparation: U. S. P.—Oleoresina Cubebæ (which see).

N. F.—Fluidextractum Buchu Compositum (which see). Fluid-extractum Cubebæ, Pilulæ Antiperiodicæ, Pilulæ Antiperiodicæ sine Aloe, Tinctura Antiperiodica, Tinctura Antiperiodica sine Aloe, Tinctura Cubebæ.

CUPRI SULPHAS, U. S. P. IX.

Cupr. Sulph.

Copper Sulphate, Cupric Sulphate (Blue Vitriol). Official in European pharmacopœias as Cuprum Sulfuricum (E), Sulfas Cupricus (S). Contains from 62.97 to 66.79 per cent of anhydrous copper sulphate corresponding to not less than 98.5 per cent of the crystallized salt, $\text{CuSO}_4 + 5\text{H}_2\text{O}$. Tests for impurities and a method of assay.

Average dose: Emetic, 0.25 gm. or 4 grains.

Preparations: N. F.—Liquor Zinci et Ferri Compositus, Mistura Adstringens.

CUSO, U. S. P. VIII. Deleted.

CYPRIPEDIUM, N. F. IV. Part II. From U. S. P. VIII. Cypriped.

Cypripedium, Lady Slipper Root. The dried rhizome and roots of *Cypripedium hirsutum* Miller or of *Cypripedium parviflorum* Salisbury without admixture of more than 5 per cent of other parts of the plant or of foreign matter. Yields not more than 12 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparation: N. F.—Fluidextractum Cypripedii.

DAMIANA, N. F. IV. Part II.

Damian.

Damiana. The leaves of *Turnera diffusa* Willdenow or of *Turnera aphorisiaca* Ward without admixture of more than 10 per cent of stems and other parts of the same plant or of foreign matter. Yields not more than 10 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparation: N. F.—Fluidextractum Damianæ.

DECOCTA, U. S. P. IX.

Decoctions. A general formula. Decoctions must be freshly made from the drugs.

DECOCTUM ALOES COMPOSITUM, N. F. III. Deleted.

DECOCTUM CETRARÆ, N. F. III. Deleted.

DECOCTUM SARSAPARILLÆ COMPOSITUM, N. F. IV. Decoc. Sarsap. Co.

Compound Decoction of Sarsaparilla. A decoction of sarsaparilla (10), sassafras (2), guaiac wood (2), glycyrrhiza (2), and mezereum (1), in water (to make 100).

Average dose: 120 mls or 4 fluid ounces.

DELPHINIUM, N. F. IV. Part II.

Delphin.

Larkspur seed. The dried seeds of *Delphinium consolida* Linné and of *Delphinium ajacis* Linné without the admixture of more than 5 per cent of foreign matter. Yields not more than 7 per cent of ash.

Preparation: N. F.—Tinctura Delphinii.

DEXTRINUM ALBUM, N. F. IV. Part II.

Dext. Alb.

White dextrin. A mixture of soluble carbohydrates, amylo-dextrin, achroodextrin, erythro-dextrin, and maltodextrin, together with a variable amount of unconverted starch, obtained by the incomplete hydrolysis of starch by the action of an acid. Yields not more than 0.5 per cent of ash.

Preparations: N. F.—Pasta Dextrinata, Stilus Acidi Salicylici Dilu-bilis.

DIACETYLMORPHINA, U. S. P. IX. New.

Diacetylmorph.

Diacetylmorphine; also sold as Heroin. Official in European pharmacopœias as Heroinum (E). An alkaloid ($C_{21}H_{23}NO_5$) pre-

pared from morphine by acetylation. Melts between 171.5 and 173.5. No weighable ash remains on incineration.

Average dose: 0.003 gm. or $\frac{1}{80}$ grain.

Preparation: N. F.—Elixir Terpini Hydratis et Diacetylmorphinæ.

DIACETYLMORPHINÆ HYDROCHLORIDUM, U. S. P. IX. New.

Diacetylmorph. Hydrochl.

Diacetylmorphine Hydrochloride, Diacetylmorphine Chloride. Official in European pharmacopœias as Diacetylmorphinæ Hydrochloridum (E). The hydrochloride ($C_{21}H_{23}NO_5 \cdot HCl + H_2O$) of the alkaloid dicaetylmorphine. Melts at about 230°, with decomposition.

Average dose: 0.003 gm. or $\frac{1}{80}$ grain.

DIASTASUM, U. S. P. IX. New.

Diastas.

Diastase. A mixture containing amylolytic enzymes obtained from an infusion of malt. It converts not less than 50 times its weight of potato starch into sugars. Tests and a method of assay.

Average dose: 0.5 gm. or 8 grains.

DIGITALIS, U. S. P. IX.

Digit.

Digitalis, Fox Glove. Included in the International Protocol as Folium Digitalis (P. I.). The dried leaves of *Digitalis purpurea* Linné without admixture of more than 2 per cent of stems, flowers, and other foreign matter. Yields not more than 15 per cent of ash. Biological method of assay with requirements.

Average dose: 0.06 gm. or 1 grain.

Preparations: U. S. P.—Fluidextractum Digitalis, Infusum Digitalis, Tinctura Digitalis.

N. F.—Pilulæ Digitalis, Scillæ et Hydrargyri, Pilulæ Opii, Digitalis et Quininæ.

DIOSCOREA, N. F. IV. Part II.

Diosc.

Dioscorea, Wild Yam Root, Colic Root. The dried rhizomes of *Dioscorea villosa* Linné. Yields not more than 7 per cent of ash.

Average dose: 4 gm. or 1 drachm.

Preparations: N. F.—Fluidextractum Dioscoreæ, Tinctura Viburni Opuli Composita.

DROSERA, N. F. IV. Part II.

Droser.

Drosera, Sundew. The air-dried flowering plant of *Drosera rotundifolia* Linné, frequently mixed with the closely allied species *Drosera intermedia* Hayne and *Drosera Longifolia* Linné. Yields not more than 30 per cent of ash.

Average dose: 4 gm. or 1 drachm.

Preparation: N. F.—Fluidextractum Droseræ.

DULCAMARA, N. F. IV. Part II.

Dulcam.

Bittersweet. The dried stems and branches of *Solanum Dulcamara* Linné. Yields not more than 6 per cent of ash.

Average dose: 4 gm. or 1 drachm.

Preparation: N. F.—Fluidextractum Dulcamaræ.

ECHINACEA, N. F. IV. Part II.

Echin.

Echinacea. The dried rhizome and roots of *Brauneria pallida* Britton. Yields not more than 6 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparation: N. F.—Fluidextractum Echinacææ.

ELASTICA, U. S. P. VIII. Deleted.

ELATERINUM, U. S. P. IX.

Elaterin.

Elaterin. A neutral principle obtained from Elaterium, a substance deposited by the juice of the fruit *Ecballium Elaterium* A. Richard. Tests for identity and for readily carbonizable impurities. 0.1 gram of elaterin leaves no weighable amount of ash.

Average dose: 0.003 gm. or $\frac{1}{20}$ grain.

Preparation: U. S. P.—Trituratio Elaterini.

ELIXIRIA, N. F. IV.

Elixirs of the N. F. should be perfectly clear preparations when dispensed, must not be exposed to extremes of temperature, and should be preserved in tightly-stoppered bottles.

ELIXIR ACIDI SALICYLICI, N. F. III. Deleted.

ELIXIR ADJUVANS, U. S. P. VIII. See Elixir Glycyrrhizæ, U. S. P. IX.

ELIXIR AMMONII BROMIDI, N. F. IV.

Elix. Ammon. Brom.

Elixir of Ammonium Bromide. Now a solution of ammonium bromide (8.5), in a mixture of syrup (20), distilled water (46), and aromatic elixir (to make 100).

Average dose: 4 mils or 1 fluidrachm.

ELIXIR AMMONII VALERATIS, N. F. IV.

Elix. Ammon. Valer.

Elixir of Ammonium Valerate, Elixir Ammonii Valerianatis, N. F. III. A solution of ammonium valerate (3.5) with chloroform (0.15), tincture of vanilla and compound tincture of cudbear in aromatic elixir (to make 100).

Average dose: 4 mils or 1 fluidrachm.

ELIXIR AMMONII VALERIANATIS, N. F. III. See Elixir Ammonii Valeratis, N. F. IV.

ELIXIR AMMONII VALERIANATIS ET QUININÆ, N. F. III. Deleted.

ELIXIR AMYGDALÆ COMPOSITUM, N. F. IV. New.

Elix. Amygdal. Co.

Compound Elixir of Almond. A solution of oil of bitter almond and vanillin in a mixture of stronger orange flower water, alcohol (5), and distilled water (to make 100).

Preparation: N. F.—Elixir Trium Bromidorum.

ELIXIR ANISI, N. F. IV.

Elix. Anis.

Elixir of Anise. A solution of anethol, oil of fennel, and spirit of bitter almond in a mixture of alcohol (24), syrup and distilled water (to make 100).

Average dose: For infants, 1 mil or 15 minims.

ELIXIR APII GRAVEOLENTIS COMPOSITUM, N. F. III. Deleted.**ELIXIR AROMATICUM, U. S. P. IX.**

Elix. Arom.

Aromatic Elixir, Simple Elixir. A mixture of compound spirit of orange (1.2), syrup (37.5), alcohol (25), and distilled water (to make 100).

Preparations: U. S. P.—Elixir Glycyrrhizæ, Liquor Ferri et Ammonii Acetatis.

N. F.—Used in making elixirs and other preparations.

ELIXIR AROMATICUM RUBRUM, N. F. IV. New. Elix. Arom. Rub.

Red Aromatic Elixir, Red Elixir. Aromatic elixir U. S. P. colored red with cudbear.

ELIXIR AURANTII AMARI, N. F. IV.

Elix. Aurant. Amar.

Elixir of Bitter Orange. To replace Elixir Curassao, N. F. III. A solution of oil of bitter orange and tincture of bitter orange peel in a mixture of alcohol (30), stronger orange flower water, syrup, and distilled water (to make 100).

ELIXIR BISMUTHI, N. F. IV.

Elix. Bismuth.

Elixir of Bismuth. A mixture of glycerite of bismuth (12.5), glycerin (12.5), distilled water (25), and aromatic elixir (to make 100).

Average dose: 4 mils or 1 fluidrachm.

ELIXIR BUCHU, N. F. IV.

Elix. Buchu.

Elixir of Buchu. A mixture of fluidextract of Buchu (12.5), with alcohol (5) syrup and aromatic elixir (to make 100).

Average dose: 4 mils or 1 fluidrachm.

Preparation: N. F.—Elixir Buchu et Potassii Acetatis.

ELIXIR BUCHU COMPOSITUM, N. F. IV.

Elix. Buchu Co.

Compound Elixir of Buchu. A mixture of compound fluidextract of buchu (25) with aromatic elixir (to make 100).

Average dose: 4 mils or 1 fluidrachm.

ELIXIR BUCHU ET POTASSII ACETATIS, N. F. IV.

Elix. Buchu et Pot. Acet.

Elixir of Buchu and Potassium Acetate. A solution of potassium acetate (8.5) in elixir of buchu (to make 100).

Average dose: 4 mils or 1 fluidrachm.

ELIXIR CAFFEINÆ, N. F. III. Deleted.

ELIXIR CALCII BROMIDI, N. F. IV. Elix. Calc. Brom.

Elixir of Calcium Bromide. A solution of calcium bromide (8.5), and diluted hydrobromic acid (0.4) in a mixture of syrup, distilled water, and aromatic elixir (to make 100).

Average dose: 4 mils or 1 fluidrachm.

ELIXIR CALCII ET SODII GLYCEROPHOSPHATUM, N. F. IV.

Elix. Calc. et Sod. Glycerophos.

Elixir of Calcium and Sodium Glycerophosphates, Elixir Glycerophosphatum, N. F. III. In effect a solution of sodium glycerophosphate (1.25), calcium glycerophosphate (0.875) and phosphoric acid (0.8), in a mixture of glycerin, aromatic elixir and distilled water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

ELIXIR CALCII HYPHOSPHITIS, N. F. IV. Elix. Calc. Hypophos.

Elixir of Calcium Hypophosphite. A solution of calcium hypophosphite (3.5), and hypophosphorous acid (0.4) in aromatic elixir (to make 100).

Average dose: 8 mils or 2 fluidrachms.

ELIXIR CALCII LACTOPHOSPHATIS, N. F. IV. Elix. Calc. Lactophos.

Elixir of Calcium Lactophosphate. In effect a solution of calcium lactophosphate (2.5), in a mixture of compound spirit of orange, syrup, alcohol (20), and distilled water (to make 100).

Average dose: 8 mils or 2 fluidrachms.

ELIXIR CARDAMOMI COMPOSITUM, N. F. IV. New. Elix. Card. Co.

Compound Elixir of Cardamom. A mixture of compound spirit of cardamom, alcohol (9) syrup, and distilled water (to make 100).

ELIXIR CASCARÆ SAGRADÆ, N. F. IV. Elix. Cascar. Sagr.

Elixir of Cascara Sagrada. Elixir Rhamni Purshianæ N. F. III. Elixir of Rhamnus Purshiana. A mixture of fluidextract of cascara sagrada (50) and aromatic elixir (to make 100).

Average dose: 4 mils or 1 fluidrachm.

ELIXIR CASCARÆ SAGRADÆ COMPOSITUM, N. F. IV.

Elix. Cascar. Sagr. Co.

Compound Elixir of Cascara Sagrada, Elixir Rhamni Purshianæ Compositum N. F. III, Laxative Elixir. A mixture of aromatic fluidextract of cascara sagrada (12.5), fluidextract of senna (7.5), fluidextract of juglans (6.5), and aromatic elixir (to make 100).

Average dose: 4 mils or 1 fluidrachm.

ELIXIR CATHARTICUM COMPOSITUM, N. F. Elix. Cathart. Co.

Compound Cathartic Elixir. A mixture of fluidextract of frangula (12.5), fluidextract of senna (10), fluidextract of rhubarb (6.2), spirit

of peppermint (1.4), solution of potassium hydroxide (0.45), with aromatic elixir (to make 100). No Saccharin.

Average dose: Aperient 4 mils or 1 fluidrachm; cathartic, 12 mils or 3 fluidrachms.

ELIXIR CHLOROFORMI COMPOSITUM, N. F. III. Deleted.

ELIXIR CINCHONÆ, N. F. III. See Elixir Cinchonæ Alkaloidarum, N. F. IV.

ELIXIR CINCHONÆ ALKALOIDORUM, N. F. IV. Elix. Cinchon. Alk.

Elixir of Cinchona Alkaloids, Elixir Cinchonæ, N. F. III, Elixir Calisaya, Alkaloidal. A solution of quinine sulphate (0.2), cinchonidine sulphate (0.1), cinchonine sulphate (0.1), in aromatic elixir (to make 100), colored with compound tincture of cudbear (5).

Average dose: 8 mils or 2 fluidrachms.

Preparations: N. F.—Elixir Cinchonæ Alkaloidorum et Ferri, Elixir Cinchonæ Alkaloidorum et Hypophosphitum.

ELIXIR CINCHONÆ ALKALOIDORUM ET FERRI, N. F. IV.

Elix. Cinchon. et Ferr.

Elixir of Cinchona Alkaloids and Iron, Elixir Cinchonæ et Ferri, N. F. III, Ferrated Elixir of Calisaya, Alkaloidal. A solution of ferric phosphate (3.5), in distilled water, mixed with elixir of cinchona alkaloids (to make 100).

Average dose: 8 mils or 2 fluidrachms.

Preparations: N. F.—Elixir Cinchonæ Alkaloidorum, Ferri et Bismuthi, Elixir Cinchonæ Alkaloidorum, Ferri et Calci Lactophosphatis, Elixir Cinchonæ Alkaloidorum, Ferri et Pepsini, Elixir Cinchonæ Alkaloidorum, Ferri et Strychninæ.

ELIXIR CINCHONÆ ALKALOIDORUM ET HYPOPHOSPHITUM, N. F. IV.

Elix. Cinchon. et Hypophos.

Elixir of Cinchona Alkaloids and Hypophosphites, Elixir Cinchonæ et Hypophosphitum, N. F. III, Elixir of Calisaya, Alkaloidal, with Hypophosphites. A solution of calcium hypophosphite (1.75), sodium hypophosphite (1.75) and hypophosphorous acid (0.8) in distilled water (12.5) and elixir of cinchona alkaloids (to make 100).

Average dose: 8 mils or 2 fluidrachms.

ELIXIR CINCHONÆ ALKALOIDORUM FERRI, BISMUTHI ET STRYCHNINÆ, N. F. IV.

Elix. Cinchon. Ferr. Bism. et Strych.

Elixir of Cinchona Alkaloids, Iron, Bismuth and Strychnine, Elixir Cinchonæ, Ferri, Bismuthi et Strychninæ, N. F. III, Elixir of Calisaya, Alkaloidal, with Iron, Bismuth and Strychnine. A solution of strychnine sulphate (0.0175) in distilled water with elixir of cinchona alkaloids, iron, and bismuth (to make 100)

Average dose: 4 mils or 1 fluidrachm.

ELIXIR CINCHONÆ ALKALOIDORUM, FERRI ET BISMUTHI, N. F. IV.

Elix. Cinchon. Ferr. et Bism.

Elixir of Cinchona Alkaloids, Iron and Bismuth, Elixir Cinchonæ, Ferri et Bismuthi, N. F. III, Elixir of Calisaya, Alkaloidal, with Iron and Bismuth. A mixture of glycerite of bismuth (6.5) with distilled water and elixir of cinchona alkaloids and iron (to make 100).

Average dose: 8 mils or 2 fluidrachms.

Preparations: N. F.—Elixir Cinchonæ Alkaloidorum Ferri, Bismuthi et Strychninæ.

ELIXIR CINCHONÆ ALKALOIDORUM, FERRI, ET CALCI LACTOPHOSPHATIS, N. F. IV.

Elix. Cinchon. Ferr. et Calc. Lactophos.

Elixir of Cinchona Alkaloids, Iron and Calcium Lactophosphate, Elixir Cinchonæ, Ferri et Calcii Lactophosphatis, N. F. III, Elixir of Calisaya, Iron and Lactophosphate of Lime. A mixture of syrup of calcium lactophosphate (50), potassium citrate (3), and elixir of cinchona alkaloids and iron (to make 100).

Average dose: 8 mils or 2 fluidrachms.

ELIXIR CINCHONÆ ALKALOIDORUM FERRI ET PEPSINI, N. F. IV.

Elix. Cinchon. Ferr. et Pepsin.

Elixir of Cinchona Alkaloids, Iron and Pepsin, Elixir Cinchonæ, Ferri et Pepsini, N. F. III, Elixir of Calisaya, Alkaloidal, with Iron and Pepsin. A mixture of glycerite of pepsin (20) with elixir of cinchona alkaloids and iron (to make 100).

Average dose: 8 mils or 2 fluidrachms.

ELIXIR CINCHONÆ ALKALOIDORUM FERRI ET STRYCHNINÆ, N. F.

Elix. Cinchon. Ferr. et Strych.

Elixir of Cinchona Alkaloids, Iron and Strychnine, Elixir Cinchonæ, Ferri et Strychninæ, N. F. III, or Elixir of Calisaya, Alkaloidal, with Iron and Strychnine. A solution of strychnine sulphate (0.0175) in distilled water and elixir of cinchona alkaloids and iron (to make 100).

Average dose: 4 mils or 1 fluidrachm.

ELIXIR CINCHONÆ ET FERRI, N. F. III. See Elixir Cinchonæ Alkaloidorum, et Ferri, N. F. IV.**ELIXIR CINCHONÆ ET HYPOPHOSPHITUM, N. F. III. See Elixir Cinchonæ Alkaloidorum et Hypophosphitum, N. F. IV.****ELIXIR CINCHONÆ FERRI, BISMUTHI, ET STRYCHNINÆ, N. F. III. See Elixir Cinchonæ Alkaloidorum, Ferri, Bismuthi et Strychninæ, N. F. IV.****ELIXIR CINCHONÆ FERRI ET BISMUTHI, N. F. III. See Elixir Cinchonæ Alkaloidorum, Ferri et Bismuthi, N. F. IV.**

ELIXIR CINCHONÆ FERRI CALCII LACTOPHOSPHATIS, N. F. III. See Elixir Cinchonæ Alkaloidorum Ferri et Calcii Lactophosphatis, N. F. IV.

ELIXIR CINCHONÆ FERRI ET PEPSINI, N. F. III. See Elixir Cinchonæ Alkaloidorum, Ferri et Pepsini, N. F. IV.

ELIXIR CINCHONÆ FERRI ET STRYCHINÆ, N. F. III. See Elixir Cinchonæ Alkaloidorum, Ferri et Strychninæ, N. F. IV.

ELIXIR CINCHONÆ, PEPSINI ET STRYCHNINÆ, N. F. III. Deleted.

ELIXIR COCÆ, N. F. III. Deleted.

ELIXIR COCÆ ET GUARANÆ, N. F. III. Deleted.

ELIXIR CORYDALIS COMPOSITUM, N. F. IV. Elix. Coryd. Co.

Compound Elixir of Corydalis. A mixture of fluidextract of corydalis (6), fluidextract of stillingiæ (6), fluidextract of xanthoxylum (3), fluidextract of iris (9), alcohol (12.5), and potassium iodide (5) with aromatic elixir (to make 100).

Average dose: 4 mils or 1 fluidrachm.

ELIXIR CURASSAO, N. F. III. See Elixir Aurantii Amari, N. F. IV.

ELIXIR DIGESTIVUM COMPOSITUM, N. F. III. Deleted.

ELIXIR ERIODICTYI AROMATICUM, N. F. IV. Elix. Eriodict. Arom.

Aromatic Elixir of Eriodictyon, Aromatic Elixir of Yerba Santa, Elixir Corrigenens. A mixture of fluidextract of eriodictyon (6), syrup (50), and compound elixir of taraxacum (to make 100).

Average dose: 4 mils or 1 fluidrachm.

ELIXIR EUCALYPTI, N. F. III. Deleted.

ELIXIR EUONYMI, N. F. III. Deleted.

ELIXIR FERRI HYPOPHOSPHITIS, N. F. IV. Elix. Ferr. Hypophos.

Elixir of Ferric Hypophosphite. A solution of ferric hypophosphite (1.65) and citric acid (2.15) in distilled water with aromatic elixir (to make 100).

Average dose: 4 mils or 1 fluidrachm.

ELIXIR FERRI LACTATIS, N. F. IV. Elix. Ferr. Lact.

Elixir of Iron Lactate. A solution of ferric lactate (1.75) and potassium citrate (5.25) in distilled water and aromatic elixir (to make 100).

Average dose: 4 mils or 1 fluidrachm.

ELIXIR FERRI PHOSPHATIS, N. F. IV. Elix. Ferr. Phos.

Elixir of Ferric Phosphate. A solution of ferric phosphate (3.5) in distilled water with aromatic elixir (to make 100).

Average dose: 4 mils or 1 fluidrachm

ELIXIR FERRI PYROPHOSPHATIS, N. F. IV. Elix. Ferr. Pyrophos.

Elixir of Ferric Pyrophosphate. A solution of ferric pyrophosphate (3.5) in distilled water with aromatic elixir (to make 100).

Average dose: 4 mils or 1 fluidrachm.

ELIXIR FERRI PYROPHOSPHATIS, QUININÆ ET STRYCHNINÆ, N. F. IV.

Elix. Ferr. Pyrophos. Quin. et Strych.

Elixir of pyrophosphate of Iron, Quinine, and Strychnine. In effect a solution of ferric pyrophosphate (3.5), quinine sulphate (0.875), and strychnine (0.014) in aromatic elixir (to make 100).

Average dose: 4 mils or 1 fluidrachm.

ELIXIR FERRI, QUININÆ ET STRYCHNINÆ N. F. IV.

Elix. Ferr. Quin. et Strych.

Elixir of Iron, Quinine, and Strychnine. In effect a solution of tincture of ferric citro-chloride (12.5), quinine hydrochloride (0.875), and strychnine sulphate (0.0175) in aromatic elixir (to make 100).

Average dose: 4 mils or 1 fluidrachm.

ELIXIR FERRI, QUININÆ ET STRYCHNINÆ PHOSPHATUM, U. S. P. VIII. Deleted.

ELIXIR FORMATUM, N. F. IV. New.

Elix. Format.

Elixir of Formates. In effect a solution of potassium formate (5) and sodium formate (5) in aromatic elixir (to make 100).

Average dose: 8 mils or 2 fluidrachms.

ELIXIR FORMATUM COMPOSITUM, N. F. IV. New.

Elix. Format. Co.

Compound Elixir of Formates. In effect a mixture of sodium formate (3), magnesium formate (2.5), lithium formate (1), strontium formate (3), quinine formate (1), glycerin, acetic ether, and formic acid, in compound elixir of cardamom (to make 100).

Average dose: 8 mils or 2 fluidrachms.

ELIXIR FRANGULA, N. F. IV. Deleted.

ELIXIR GENTIANÆ, N. F. IV.

Elix. Gent.

Elixir of Gentian. A mixture of fluidextract of gentian (3.5) with compound spirit of cardamom (1.5), sodium citrate (3), glycerin (5), syrup, alcohol (20), and distilled water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

Preparations: N. F.—Elixir Gentianæ et Ferri, Elixir Gentianæ et Ferri Phosphatis.

ELIXIR GENTIANÆ CUM TINCTURA FERRI CHLORIDI, N. F. III. See Elixi Gentianæ et Ferri, N. F. IV.

ELIXIR GENTIANÆ ET FERRI, N. F. IV.

Elix. Gent. et Ferr.

Elixir of Gentian and Iron. Elixir Gentianæ cum Tinctura Ferri Chloridi, N. F. III. Elixir of Gentian with Tincture of

Ferric Citro-Chloride. A mixture of tincture of ferric citro-chloride (10) with elixir of gentian (to make 100).

Average dose: 4 mils or 1 fluidrachm.

ELIXIR GENTIANÆ ET FERRI PHOSPHATIS, N. F. IV.

Elix. Gent. et Ferr. Phosph.

Elixir of Gentian and Ferric Phosphate, Elixir Gentianæ Ferratum. A solution of ferric phosphate (1.75) in distilled water with elixir of gentian (to make 100).

Average dose: 4 mils or 1 fluidrachm.

ELIXIR GENTIANÆ GLYCERINATUM, N. F. IV. Elix. Gent. Glycerin.

Glycerinated Elixir of Gentian. Now a mixture of fluidextract of gentian (1), fluidextract of taraxacum (1.5), acetic ether, phosphoric acid, tincture of sweet orange peel, compound tincture of cardamom, glycerin, sugar, and sherry wine (to make 100). No saccharin.

Average dose: 8 mils or 2 fluidrachms.

ELIXIR GLYCEROPHOSPHATUM, N. F. III.

See Elixir Calcii et Sodii Glycerophosphatum, N. F. IV.

ELIXIR GLYCEROPHOSPHATUM COMPOSITUM, N. F. IV.

Elix. Glycerophos. Co.

Compound Elixir of Glycerophosphates, Compound Solution of Glycerophosphates. In effect a mixture of sodium glycerophosphate (2), calcium glycerophosphate (1.6), ferric glycerophosphate (0.3), manganese glycerophosphate (0.2), quinine glycerophosphate (0.1), strychnine glycerophosphate (0.015), with lactic acid in compound elixir of cardamom (to make 100).

Average dose: 8 mils or 2 fluidrachms.

ELIXIR GLYCYRRHIZÆ, N. F. III. Deleted.

ELIXIR GLYCYRRHIZÆ, U. S. P. IX.

Elix. Glycyrrh.

Elixir of glycyrrhiza, Elixir of Licorice, Elixir Adjuvans, U. S. P. VIII. A mixture of fluidextract of glycyrrhiza (12.5) and aromatic elixir (to make 100).

ELIXIR GLYCYRRHIZÆ AQUOSUM, N. F. IV. New.

Elix. Glycyrrh. Aq.

Aqueous Elixir of Glycyrrhiza., Aqueous Elixir of Licorice. A mixture of fluidextract of glycyrrhiza (15), compound spirit of cardamom (0.5), stronger orange flower water (20), glycerin (15), syrup (15), and distilled water (to make 100).

Average dose: 8 mils or 2 fluidrachms.

ELIXIR GLYCYRRHIZÆ AROMATICUM, N. F. IV. Elix. Glycyrrh. Arom.

Aromatic Elixir of Glycyrrhiza, Aromatic Elixir of Licorice. A mixture of fluidextract of glycyrrhiza (12.5), oil of clove, oil of

cassia, oil of myristica, and oil of fennel, with aromatic elixir (to make 100).

Average dose: 8 mils or 2 fluidrachms.

ELIXIR GRINDELLÆ, N. F. III. Deleted.

ELIXIR GUARANÆ, N. F. IV.

Elix. Guar.

Elixir of Guarana. A mixture of fluidextract of guarana (20) with aromatic elixir (20) and compound elixir of taraxacum (to make 100).

Average dose: 4 mils or 1 fluidrachm.

ELIXIR HUMULI, N. F. IV.

Elix. Humul.

Elixir of Hops. A mixture of fluidextract of hops (12.5) and tincture of vanilla (3) with compound elixir of taraxacum (12.5) and aromatic elixir (to make 100).

Average dose: 8 mils or 2 fluidrachms.

ELIXIR HYPOPHOSPHITUM, N. F. IV.

Elix. Hypophos.

Elixir of Hypophosphites. A solution of calcium hypophosphite (5.25), sodium hypophosphite (1.75), potassium hypophosphite (1.75), with hypophosphorous acid in a mixture of distilled water, glycerin, compound spirit of cardamom, and aromatic elixir (to make 100).

Average dose: 8 mils or 2 fluidrachms.

ELIXIR HYPOPHOSPHITUM CUM FERRI, N. F. III. See Elixir Hypophosphitum et Ferri, N. F. IV.

ELIXIR HYPOPHOSPHITUM ET FERRI, N. F. IV.

Elix. Hypophos. et Ferr.

Elixir of Hypophosphites and Iron. A solution of calcium hypophosphite (1.75), sodium hypophosphite (1.75), potassium hypophosphite (0.875), ferric hypophosphite (0.875), and potassium citrate with hypophosphorous acid, in a mixture of distilled water, syrup, and aromatic elixir (to make 100).

Average dose: 8 mils or 2 fluidrachms.

ELIXIR LITHII BROMIDI, N. F. IV.

Elix. Lith. Brom.

Elixir of Lithium Bromide. Now a solution of lithium bromide (8.5), in a mixture of syrup (20), distilled water (46), and aromatic elixir (to make 100).

Average dose: 8 mils or 2 fluidrachms.

ELIXIR LITHII CITRATIS, N. F. IV.

Elix. Lith. Cit.

Elixir of Lithium Citrate. A solution of lithium citrate (8.5) in aromatic elixir (to make 100).

Average dose: 8 mils or 2 fluidrachms.

ELIXIR LITHII SALICYLATIS, N. F. IV.

Elix. Lith. Salicyl.

Elixir of Lithium Salicylate. A solution of lithium salicylate (8.5) in aromatic elixir (to make 100).

Average dose: 8 mils or 2 fluidrachms.

ELIXIR MALTI ET FERRI, N. F. III. Deleted.

ELIXIR PARALDEHYDI, N. F. III. Deleted.

ELIXIR PEPSINI, N. F. IV.

Elix. Pepsin.

Elixir of Pepsin. A mixture of glycerite of pepsin, (20) with glycerin (10), hydrochloric acid (0.4), and aromatic elixir (to make 100).

Average dose: 8 mils or 2 fluidrachms.

Preparation: N. F.—Elixir Pepsini et Ferri.

ELIXIR PEPSINI, BISMUTHI ET STRYCHNINÆ, N. F. IV.

Elix. Pepsin. Bism. et Strych.

Elixir of Pepsin, Bismuth, and Strychnine. A solution of strychnine (0.0175) and tartaric acid in elixir of pepsin and bismuth (to make 100).

Average dose: 4 mils or 1 fluidrachm.

ELIXIR PEPSINI ET BISMUTHI, N. F. IV.

Elix. Pepsin et Bism.

Elixir of Pepsin and Bismuth. Now a mixture containing pepsin (0.85), glycerin (12.5), glycerite of bismuth (12.5), with distilled water, tincture of caramel, and aromatic elixir (to make 100).

Average dose: 8 mils or 2 fluidrachms.

Preparation: N. F.—Elixir Pepsini, Bismuthi et Strychninæ.

ELIXIR PEPSINI ET FERRI, N. F. IV.

Elixir. Pepsin et Ferr.

Elixir of Pepsin and Iron. A mixture of tincture of ferric citrochloride (7.5), and elixir of pepsin (to make 100).

Average dose: 8 mils or 2 fluidrachms.

ELIXIR PEPSINI ET RENNINI COMPOSITUM, N. F. IV.

Elix. Pepsin. et Rennin. Co.

Compound Elixir of Pepsin and Rennin. *Essentia Pepsini, N. F. III.* As modified, a mixture containing pepsin (2.25), rennin (1.65), lactic acid (0.2), tincture of sweet orange peel, glycerin, alcohol (20), oil of myristica, and distilled water (to make 100).

Average dose: 8 mils or 2 fluidrachms.

ELIXIR PHOSPHORI, N. F. IV.

Elix. Phosphor.

Elixir of Phosphorus. Essentially phosphorus (0.025), dissolved in chloroform and mixed with alcohol (34), glycerin (30), compound spirit of orange, oil of anise, and distilled water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

Preparation: N. F.—Elixir Phosphori et Nucis Vomicæ.

ELIXIR PHOSPHORI ET NUCIS VOMICÆ, N. F. IV.

Elix. Phosphor. et Nuc. Vom.

Elixir of Phosphorus and Nux Vomica. A mixture of tincture of nux vomica (3.5), with elixir of pepsin (to make 100).

Average dose: 4 mils or 1 fluidrachm.

ELIXIR PICIS COMPOSITUM, N. F. III. Deleted.

ELIXIR PILOCAMP, N. F. III. Deleted.

ELIXIR POTASSII ACETATIS, N. F. IV. Elix. Pot. Acet.

Elixir of Potassium Acetate. A solution of potassium acetate (8.5), in aromatic elixir (to make 100).

Average dose: 15 mils or 4 fluidrachms.

ELIXIR POTASSII ACETATIS ET JUNIPERI, N. F. IV.

Elix. Pot. Acet. et Junip.

Elixir of Potassium Acetate and Juniper. A solution of potassium acetate (8.5) and fluidextract of juniper (12.5) in aromatic elixir (to make 100).

Average dose: 15 mils or 4 fluidrachms.

ELIXIR POTASSII BROMIDI, N. F. IV.

Elix. Pot. Brom.

Elixir of Potassium Bromide. Now a solution of potassium bromide (17.5) in a mixture of syrup, distilled water, and aromatic elixir (to make 100). It may be colored with compound tincture of cudbear.

Average dose: 8 mils or 2 fluidrachms.

ELIXIR QUININÆ ET PHOSPHATUM COMPOSITUM, N. F. III.

Deleted.

ELIXIR QUININÆ VALERATIS ET STRYCHNINÆ, N. F. IV.

Elix. Quin. Valer. et Strych.

Elixir of Quinine Valerate and Strychnine, Elixir Quininæ Valerianatis et Strychninæ N. F. III. A solution of quinine valerate (1.75) and strychnine sulphate (0.0175) in a mixture of compound tincture of cudbear, distilled water, and aromatic elixir (to make 100).

Average dose: 4 mils or 1 fluidrachm.

ELIXIR QUININÆ VALERIANATIS ET STRYCHNINÆ, N. F. III.

See Elixir Quininæ Valeratis et Strychninæ, N. F. IV.

ELIXIR RHAMNI PURSHIANÆ, N. F. III. See Elixir Cascariæ Sagradæ, N. F. IV.

ELIXIR RHAMNI PURSHIANÆ COMPOSITUM, N. F. III. See Elixir Cascariæ Sagradæ Compositum, N. F. IV.

ELIXIR RHEI, N. F. III. Deleted.

ELIXIR RHEI MAGNESII ACETATIS, N. F. III. Deleted.

ELIXIR RUBI COMPOSITUM, N. F. IV. Elix. Rub. Co.

Compound Elixir of Blackberry. Now a mixture of blackberry root (1.6), nutgall (1.6), saigon cinnamon (1.6), clove (0.4), mace (0.2), and ginger (0.2), extracted with diluted alcohol (to make 25) and mixed with syrup of blackberry (to make 100).

Average dose: 15 mils or 4 fluidrachms.

ELIXIR SODII BROMIDI, N. F. IV.**Elix. Sod. Brom.**

Elixir of Sodium Bromide. Now a solution of sodium bromide (17.5) in a mixture of syrup, distilled water, and aromatic elixir (to make 100).

Average dose: 8 mils or 2 fluidrachms.

ELIXIR SODII HYPOPHOSPHITIS, N. F. IV.**Elix. Sod. Hypophos.**

Elixir of sodium hypophosphite. A solution of sodium hypophosphite (3.5) with hypophosphorous acid (0.4) in aromatic elixir (to make 100).

Average dose: 4 mils or 1 fluidrachm.

ELIXIR SODII SALICYLATIS, N. F. IV.**Elix. Sod. Salicyl.**

Elixir of Sodium Salicylate. A solution of sodium salicylate (8.5) in a mixture of syrup, distilled water, and aromatic elixir (to make 100).

Average dose: 4 mils or 1 fluidrachm.

ELIXIR SODII SALICYLATIS COMPOSITUM, N. F. IV. New.**Elix. Sod. Salicyl. Co.**

Compound Elixir of Sodium Salicylate. A solution of sodium salicylate (8), with fluidextract of cimicifuga (3.2), fluidextract of gelsemium (1.6), and potassium iodide (1.5) in aromatic elixir (to make 100).

Average dose: 4 mils or 1 fluidrachm.

ELIXIR STILLINGIÆ COMPOSITUM, N. F. III. Deleted.**ELIXIR STRYCHNINÆ VALERATIS, N. F. IV.****Elix. Strych. Valer.**

Elixir of Strychnine Valerate, Elixir Strychninæ Valerianatis, N. F. III. A solution of strychnine valerate (0.0175) in distilled water mixed with tincture of vanilla, compound tincture of cudbear, and aromatic elixir (to make 100).

Average dose: 4 mils or 1 fluidrachm.

ELIXIR STRYCHNINÆ VALERIANATIS, N. F. III. See Elixir Strychninæ Valeratis, N. F. IV.**ELIXIR TARAXACI COMPOSITUM, N. F. IV.****Elix. Tarax. Co.**

Compound Elixir of Taraxacum. A mixture of fluidextract of taraxacum (3.5), fluidextract of wild cherry (2), fluidextract of glycyrrhiza (6), tincture of sweet orange peel (6), tincture of cinnamon (3), compound tincture of cardamon (3), and aromatic elixir (to make 100).

Average dose: 8 mils or 2 fluidrachms.

Preparations: N. F.—Elixir Eriodictyi Aromaticum, Elixir Guaranae, Elixir Humuli, Elixir Viburni Opuli Compositum.

ELIXIR TERPINI HYDRATIS, N. F. IV.**Elix. Terpin. Hyd.**

Elixir of Terpin Hydrate. Now a solution of terpin hydrate (1.75) in a mixture of tincture of sweet orange peel (2), spirit of bitter almond

(0.5), alcohol (42.5), glycerin (40), syrup (10), and distilled water (to make 100). No saccharin.

Average dose: 4 mils or 1 fluidrachm.

Preparations: N. F.—Elixir Terpini Hydratis cum Codeinæ, Elixir Terpini Hydratis cum Diacetylmorphinæ.

ELIXIR TERPINI HYDRATUS CUM CODEINA, N. F. III. See Elixir Terpini Hydratis et Codeinæ, N. F. IV.

ELIXIR TERPINI HYDRATIS CUM HEROINA, N. F. III. See Elixir Terpini Hydratis et Diacetylmorphinæ, N. F. IV.

ELIXIR TERPINI HYDRATIS ET CODEINÆ, N. F. IV.

Elix. Terpin. Hyd. et Codein.

Elixir of Terpin Hydrate and Codeine. Now a solution of codeine (0.2) in elixir of terpin hydrate (to make 100).

Average dose: 4 mils or 1 fluidrachm.

ELIXIR TERPINI HYDRATIS ET DIACETYLMORPHINÆ, N. F. IV.

Elixir Terpin. Hyd. et Diacetylmorph.

Elixir of Terpin Hydrate and Diacetylmorphine. Elixir Terpini Hydratis cum Heroina, N. F. III. Now a solution of diacetylmorphine hydrochloride (0.027) in elixir of terpin hydrate (to make 100).

Average dose: 4 mils or 1 fluidrachm.

ELIXIR TRIUM BROMIDORUM, N. F. IV. New. Elix. Tri. Brom.

Elixir of Three Bromides. A solution of ammonium bromide (8), potassium bromide (8), and sodium bromide (8) in compound elixir of almond (to make 100), colored red with cudbear.

Average dose: 4 mils or 1 fluidrachm.

ELIXIR TURNERÆ, N. F. III. Deleted.

ELIXIR VANILLINI COMPOSITUM, N. F. IV. New. Elix. Vanil. Co.

Compound Elixir of Vanillin. A mixture of compound spirit of vanillin (2), alcohol (8), glycerin, syrup, tincture of cardamom, and distilled water (to make 100).

ELIXIR VIBURNI OPULI COMPOSITUM, N. F. IV.

Elix. Viburn. Opul. Co.

Compound Elixir of Viburnum Opulus. A mixture of fluid-extract of viburnum opulus (7.5), fluidextract of trillium (15), fluid-extract of âletris (7.5), and compound elixir of taraxacum (to make 100).

Average dose: 4 mils or 1 fluidrachm.

ELIXIR VIBURNI PRUNIFOLII, N. F. IV. Elix. Viburn. Prun.

Elixir of Viburnum Prunifolium, Elixir of Black Haw. A mixture of fluidextract of viburnum prunifolium (12.5), compound tincture of cardamom (7.5), and aromatic elixir (to make 100).

Average dose: 4 mils or 1 fluidrachm.

ELIXIR ZINCI VALERATIS, N. F. IV. Elix. Zinc. Valer.

Elixir of Zinc Valerate, Elixir Zinci Valerianatis, N. F. III. A solution of zinc valerate (1.75) with citric acid (5.6) in a mixture of alcohol (12.5), spirit of bitter almond, compound tincture of cudbear, distilled water and aromatic elixir (to make 100).

Average dose: 4 mils or 1 fluidrachm.

ELIXIR ZINCI VALERIANATIS, N. F. III. See Elixir Zinci Valeratis N. F. IV.

EMETINÆ HYDROCHLORIDUM, U. S. P. IX. New. Emet. Hydrochl.

Emetine Hydrochloride. The hydrochloride ($C_{10}H_{14}O_4N_2 \cdot 2HCl$) of the alkaloid emetine, obtained from ipecac. 0.2 gm. leaves no weighable amount of ash. Tests for identity and purity.

Average dose: 0.02 gm. or $\frac{1}{2}$ grain.

EMPLASTRUM ADHÆSIUM, U. S. P. VIII. See Emplastrum Elasticum, U. S. P. IX.

EMPLASTRUM AMMONIACI, N. F. III. Deleted.

EMPLASTRUM AMMONIACI CUM HYDRARGYRO, N. F. III. Deleted.

EMPLASTRUM ARNICÆ, N. F. III. Deleted.

EMPLASTRUM AROMATICUM, N. F. III. Deleted.

EMPLASTRUM ASAFŒTIDÆ, N. F. III. Deleted.

EMPLASTRUM BELLADONNÆ, U. S. P. IX. Emp. Bellad.

Belladonna Plaster. An adhesive plaster containing 30 per cent of extract of belladonna leaves and yielding from 0.35 to 0.40 per cent of alkaloids from belladonna leaves. Method of assay.

EMPLASTRUM CANTHARIDIS, U. S. P. IX. New Emp. Canthar.

Cantharides Plaster. Cantharides cerate spread on rosin plaster. Should not be dispensed unless it has been freshly prepared.

EMPLASTRUM CAPSICI, U. S. P. IX. Emp. Capsic.

Capsicum Plaster. Oleoresin of capsicum spread on rubber plaster. Each 15 square centimeters of spread plaster should contain 0.25 gm. of oleoresin of capsicum.

EMPLASTRUM ELASTICUM, U. S. P. IX. New. Emp. Elast.

Rubber Plaster, Rubber Adhesive Plaster. In place of Emplastrum Adhæsivum U. S. P. VIII. A mixture of rubber, resins, and waxes with a filler of an absorbent powder, such as orris root or starch, mechanically mixed and spread upon cotton cloth or other fabric.

Preparation: U. S. P.—Emplastrum Capsici.

EMPLASTRUM FERRI, N. F. III. Deleted.

EMPLASTRUM FUSCUM CAMPHORATUM, N. F. IV. Emp. Fusc. Camph.

Camphorated Brown Plaster, Camphorated Mother Plaster. A combination by means of heat, of red oxide of lead (30) and olive oil (60), mixed with yellow wax (15) and camphor (1).

Preparation: N. F.—Unguentum Fuscum.

EMPLASTRUM GALBANI, N. F. III. Deleted.

EMPLASTRUM HYDRARGYRI, U. S. P. VIII. Deleted.

EMPLASTRUM OPII, U. S. P. VIII. Deleted.

EMPLASTRUM PICIS BURGUNDICÆ, N. F. III. Deleted.

EMPLASTRUM PICIS CANADENSIS, N. F. III. Deleted.

EMPLASTRUM PICIS CANTHARIDATUM, N. F. III. Deleted.

EMPLASTRUM PICIS LIQUIDÆ COMPOSITUM, N. F. III. Deleted.

EMPLASTRUM PLUMBI, U. S. P. IX. Emp. Plumb.

Lead Plaster. Diachylon Plaster. A lead soap made by boiling equal parts of lead oxide, olive oil, and lard in water.

Preparations: U. S. P.—Emplastrum Resinæ, Unguentum Diachylon.

N. F.—Unguentum Saponis.

EMPLASTRUM RESINÆ, U. S. P. IX. From N. F. III. Emp. Res.

Rosin Plaster, Rosin Adhesive Plaster, Adhesive Plaster. A mixture of rosin (14), lead plaster (80) and yellow wax (6).

EMPLASTRUM SAPONIS, N. F. IV. From U. S. P. VIII. Emp. Sapon.

Soap Plaster. A mixture of soap (10) and lead plaster (to make 100).

EMPLASTRUM SINAPIS, U. S. P. IX. Emp. Sinap.

Mustard Plaster, Charta Sinapis, U. S. P. VIII, Mustard Paper. A uniform mixture of black mustard, deprived of its fixed oil, and a solution of rubber, spread on paper, cotton cloth, or other fabric. A square of 100 square centimeters contains not less than 2.5 gm. of black mustard deprived of its fixed oil.

EMULSA, N. F. IV.

Emulsions. A general description with formulas for flavoring.

EMULSA SYMBOLICA, N. F. III. Deleted.

EMULSUM AMMONIACI, N. F. III. Deleted.

EMULSUM AMYGDALÆ, U. S. P. IX. Emuls. Amygd.

Emulsion of Almond, Milk of Almond. A mixture of sweet almond (6), acacia (1), sugar (3), and water (to make 100).

EMULSUM ASAFŒTIDÆ, U. S. P. IX Emuls. Asafœt.

Emulsion of Asafetida, Milk of Asafetida. A mixture of asafetida (4) and water (to make 100).

Average dose: 15 mils or 4 fluidrachms.

EMULSUM CHLOROFORMI, U. S. P. VIII. Deleted.

EMULSUM OLEI MORRHUÆ, U. S. P. IX. Emuls. Ol. Morrh.

Emulsion of Cod Liver Oil. Official in European pharmacopœias as Emulsio Olei Jecoris Aselli (E). A mixture of cod liver oil (50), acacia (12.5), syrup (10), methyl salicylate (0.4), and water (to make 100).

Average dose: 15 mils or 4 fluidrachms.

EMULSUM OLEI MORRHUÆ CUM CALCII ET SODII PHOSPHATIBUS, N. F. III. Deleted.

EMULSUM OLEI MORRHUÆ CUM CALCII LACTOPHOSPHATE, N. F. IV.

Emuls. Ol. Morrh. c. Calc. Lactophos.

Emulsion of Cod Liver Oil with Calcium Lactophosphate. Now a mixture of cod liver oil (50), calcium lactophosphate (5), lactic acid (1.6), with acacia, syrup of tolu, flavoring, and water (to make 100).

Average dose: 15 mils or 4 fluidrachms.

EMULSUM OLEI MORRHUÆ CUM CALCII PHOSPHATE, N. F. IV.

Emuls. Ol. Morrh. c. Calc. Phos.

Emulsion of Cod Liver Oil with Calcium Phosphate, Emulsion of Cod Liver Oil with Phosphate of Lime. Now a mixture of cod liver oil (50), precipitated calcium phosphate (3.5), with acacia, syrup of tolu, flavoring, and water (to make 100).

Average dose: 15 mils or 4 fluidrachms.

EMULSUM OLEI MORRHUÆ CUM EXTRACTO MALTI, N. F. III. See Emulsium Olei Morrhue cum Malto, N. F. IV.

EMULSUM OLEI MORRHUÆ CUM HYPOPHOSPHITIBUS, N. F. IV. From U. S. P. VIII. Emuls. Ol. Morrh. c. Hypophos.

Emulsion of Cod Liver Oil with Hypophosphites. A mixture of cod liver oil (50), calcium hypophosphite (1), potassium hypophosphite (0.5), and sodium hypophosphite (0.5), with acacia, syrup, flavoring, and water (to make 100).

Average dose: 8 mils or 2 fluidrachms.

EMULSUM OLEI MORRHUÆ CUM MALTO, N. F. IV.

Emuls. Ol. Morrh. c. Malt.

Emulsion of Cod Liver Oil with Extract of Malt. Now a mixture of cod liver oil (30) with tragacanth, water, and extract of malt (to make 100).

Average dose: 15 mils or 4 fluidrachms.

EMULSUM OLEI MORRHUÆ CUM PRUNO VIRGINIANA, N. F. IV.

Emuls. Ol. Morrh. c. Prun. Virg.

Emulsion of Cod Liver Oil with Wild Cherry. Now a mixture of cod liver oil (50) and fluidextract of wild cherry (6.5) with acacia, syrup of tolu, flavoring, and water (to make 100).

Average dose: 15 mils or 4 fluidrachms.

EMULSUM OLEI MORRHUÆ CUM VITELLO, N. F. IV. New.

Emuls. Ol. Morrh. c. Vitel.

Emulsion of Cod Liver Oil with Egg, Glyconin Emulsion of Cod Liver Oil, N. F. III. A mixture of cod liver oil (50), and glycerite of yolk of egg (17.5), with syrup of tolu, flavoring, and water (to make 100).

Average dose: 15 mils or 4 fluidrachms.

EMULSUM OLEI RICINI, N. F. IV.

Emuls. Ol. Ricin.

Emulsion of Castor Oil. Now a mixture of castor oil (35) with acacia, tincture of vanilla, syrup, and water (to make 100).

Average dose: 45 mils or 1½ fluidounces.

EMULSUM OLEI TEREBINTHINÆ, U. S. P. IX.

Emuls. Ol. Tereb.

Emulsion of Oil of Turpentine. A mixture of rectified oil of turpentine (15), expressed oil of almond (5), syrup (25), acacia (15), and water (to make 100).

Average dose: 2 mils or ½ fluidrachm.

EMULSUM OLEI TEREBINTHINÆ FORTIOR, N. F. III. Deleted.**EMULSUM PETROLATI, N. F. IV.**

Emuls. Petrolat.

Emulsion of Petrolatum, Emulsion Petrolei, N. F. III. Now a mixture of petrolatum (22.5) and expressed oil of almonds (22.5) with acacia, syrup, tincture of lemon peel, and water (to make 100).

Average dose: 15 mils or 4 fluidrachms.

EMULSUM PETROLEI, N. F. III. See Emulsum Petrolati, N. F. IV.**EMULSUM PHOSPHATICUM, N. F. III. Deleted.****ERGOTA, U. S. P. IX.**

Ergot.

Ergot, Ergot of Rye, Spurred Rye. Included in the International Protocol as *Secale Cornutum* (P. I.). The dried sclerotium of *Calviceps purpurea* Tulasne, replacing the grain of rye, *Secale cereale* Linné. Without admixture of more than 5 per cent of harmless seeds, fruits, and other foreign matter. Must be carefully preserved to prevent attacks by insects. Ergot yields not more than 5 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparations: U. S. P.—Extractum Ergotæ, Fluidextractum Ergotæ.

N. F.—Extractum Ergotæ Aquosum, Tinctura Ergotæ Ammoniata.

ERIODICTYON, U. S. P. IX.

Eriodict.

Eriodictyon, Yerba Santa. The dried leaves of *Eriodictyon californicum* Greene, without admixture of more than 5 per cent of stems or other foreign matter.

Average dose: 1 gm. or 15 grains.

Preparation: U. S. P.—Fluidextractum Eriodictyi (which see).

ESSENTIA PEPSINI, N. F. III. See Elixir Pepsini et Rennini Compositum, N. F. IV.

EUCALYPTOL, U. S. P. IX.

Eucalyptol.

Eucalyptol, Cineol. An organic compound ($C_{10}H_{18}O$) obtained from the volatile oil of *Eucalyptus globulus* Labillardière and from other sources. Specific gravity 0.921 to 0.923 at 25°. Boils between 174° and 177°. Congeals not below 0°.

Average dose: 0.3 mil. or 5 minims.

Preparations: N. F.—Liquor Antisepticus, Liquor Antisepticus Alkalinus, Liquor Pepsini Antisepticus, Nebula Aromatica, Nebula Eucalyptolis, Nebula Mentholis, Composita, Petroxolinum Eucalyptolis, Petroxolinum Iodoformi, Petroxolinum Sulphurata Compositum, Pulvis Antisepticus.

EUCALYPTUS, U. S. P. IX.

Eucalypt.

Eucalyptus, Blue Gum Leaves. The dried leaves of *Eucalyptus globulus* Labillardière collected from the older parts of the tree, without admixture of more than 3 per cent of foreign matter.

Average dose: 2 gm. or 30 grains.

Preparation: U. S. P.—Fluidextractum Eucalypti.

EUGENOL, U. S. P. IX.

Eugenol. An unsaturated aromatic phenol ($C_{10}H_{12}O_2$) obtained from oil of clove and from other sources. Specific gravity from 1.064 to 1.070 at 25°. Boils between 250° and 255°. Eugenol is optically inactive and strongly refractive.

Average dose: 0.2 mil. or 3 minims.

Preparation: N. F.—Mistura Oleo-Balsamica.

EUONYMUS, N. F. IV, Part II. From U. S. P. VIII.

Euonym.

Euonymus, Evonymus, Wahoo Bark, Burning Bush Bark. The dried bark of the root of *Euonymus Atropurpureus* Jacquin, without admixture of more than 3 per cent of wood and other foreign matter. Yields not more than 12 per cent of ash.

Average dose: 0.5 gm. or 8 grains. Caution—avoid an accumulation of the drug.

Preparations: N. F.—Extractum Euonymi, Fluidextractum Euonymi.

EUPATORIUM, N. F. IV, Part II. From U. S. P. VIII. Eupator.

Eupatorium, Thoroughwort, Boneset. The dried leaves and flowering tops of *Eupatorium perfoliatum* Linné. Yields not more than 10 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparation: N. F.—Fluidextractum Eupatorii.

EUPHORBIA PILULIFERA, N. F. IV, Part II. Euphorb. Pilul.

Euphorbia Pilulifera, Pill bearing Spurge. The dried entire, annual herb of *Euphorbia pilulifera* Linné collected while flowering and fruiting. Yields not more than 12 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparation: N. F.—Fluidextractum Euphorbiæ Piluliferæ.

EXTRACTA, U. S. P. IX, N. F. III.

Extracts. General formulas with descriptions of pilular extracts and of powdered extracts.

EXTRACTUM ACONITI, U. S. P. IX. From N. F. III. Ext. Aconit.

Extract of Aconite. Powdered Extract of Aconite. Yields from 1.8 to 2.2 per cent of the ether-soluble alkaloids of aconite. Method of assay and a biological assay.

Average dose: 0.01 gm. or $\frac{1}{4}$ grains.

EXTRACTUM ALOES, N. F. IV. From U. S. P. VIII. Ext. Aloes.

Extract of Aloes. Standardized aqueous extract (1-2) of aloes.

Average dose: 0.125 gm. or 2 grains.

Preparations: N. F.—Pilulæ Antiperiodicæ, Tinctura Antiperiodica

EXTRACTUM ARNICÆ RADICIS, N. F. III. Deleted.

EXTRACTUM BELLADONNÆ FOLIORUM, U. S. P. IX. Ext. Bellad. Fol.

Extract of Belladonna Leaves. Official in European pharmacopœias as Extractum Belladonnæ (E), included in the International Protocol as Belladonnæ Extractum (P. I.). Yields from 1.18 to 1.32 per cent of the alkaloids of belladonna leaves. One gram represents about 4 grams of belladonna leaves. Pilular extract and powdered extract with methods of assay.

Average dose: 0.015 gm. or $\frac{1}{4}$ grains.

Preparations: U. S. P.—Unguentum Belladonnæ (From pilular extract).

N. F.—Pilulæ Aloes et Podophylli Compositæ, Pilulæ Aloini Compositæ, Pilulæ Aloini Strychninæ et Belladonnæ, Pilulæ Aloini, Strychninæ et Belladonnæ Compositæ, Pilulæ Antidyspepticæ, Pilulæ Laxativæ Compositæ.

EXTRACTUM CANNABIS, U. S. P. IX.

Ext. Cannab.

Extract of Cannabis. A pilular extract representing the alcohol-soluble constituents of cannabis. Biological assay.

Average dose: 0.01 gm. or $\frac{1}{4}$ grain.

Preparations: N. F.—Mistura Chlorali et Potassii Bromidi Composita.

EXTRACTUM CANNABIS INDICÆ, U. S. P. VIII. See *Extractum Cannabis, U. S. P. IX.***EXTRACTUM CARNIS, N. F. IV, Part II.**

Ext. Carnis.

Extract of Beef, Beef Extract. The residue obtained from fresh beef broth by evaporation at a low temperature.

Preparations: N. F.—Vinum Carnis, Vinum Carnis et Ferri.

EXTRACTUM CASCARÆ SAGRADÆ, U. S. P. IX.

Ext. Cascar. Sagr.

Extract of Cascara Sagrada, *Extractum Rhamni Purshianæ, U. S. P. VIII.* Powdered extract of Cascara Sagrada. One gram represents the water-soluble constituents of 3 grams of cascara sagrada.

Average dose: 0.25 gm. or 4 grains.

Preparation: N. F.—Pilulæ Aloini, Strychninæ et Belladonnæ Compositæ.

EXTRACTUM CIMICIFUGÆ, U. S. P. IX.

Ext. Cimicif.

Extract of Cimicifuga, Powdered Extract of Cimicifuga. One gram of the powdered extract represents the alcohol-soluble constituents of 4 grams of cimicifuga.

Average dose: 0.25 gm. or 4 grains.

EXTRACTUM CINCHONÆ, N. F. IV.

Ext. Cinchon.

Extract of Cinchona. Yields from 22 to 26 per cent of total alkaloïds from cinchona. Method of assay. Made by extracting cinchona with a mixture of alcohol (3) and water (1).

Average dose: 0.25 gm. or 4 grains.

EXTRACTUM COLCHICI CORMI, U. S. P. IX.

Ext. Colch. Corm.

Extract of Colchicum Corm, Powdered Extract of Colchicum, Corm. One gram of the powdered extract of colchicum corm yields from 1.25 to 1.55 per cent of colchicine. One gram represents the alcohol-soluble constituents of 4 grams of colchicum corm. Method of assay.

Average dose: 0.06 gm. or 1 grain.

EXTRACTUM COLOCYNTHIDIS, U. S. P. IX.

Ext. Colocynth.

Extract of Colocynth, Powdered Extract of Colocynth. One gram represents 4 grams of colocynth pulp, extracted with diluted alcohol.

Average dose: 0.03 gm. or $\frac{1}{4}$ grain.

Preparations: U. S. P.—*Extractum Colocynthis Compositum* (which see).

N. F.—*Pilulæ Colocynthis Compositæ*, *Pilulæ Colocynthis et Hyoscyami*, *Pilulæ Antidyspepticæ*.

EXTRACTUM COLOCYNTHIS COMPOSITUM, U. S. P. IX.

Ext. Colocynth. Co.

Compound Extract of Colocynth, Powdered Compound Extract of Colocynth. A mixture of extract of colocynth (16), aloes (50), cardamom seed (5), resin of scammony (14), and soap (15).

Average dose: 0.25 gm. or 4 grains.

Preparations: U. S. P.—*Pilulæ Catharticæ Compositæ*.

N. F.—*Pilulæ Catharticæ Vegetabiles*, *Pilulæ Colocynthis et Podophylli*, *Pilulæ Laxativæ Post Partum*.

EXTRACTUM CONII, N. F. IV.

Ext. Conii.

Extract of Conium. Yields from 1.8 to 2.2 per cent of coniine. Method of assay. Made by extracting conium with diluted alcohol.

Average dose: 0.03 gm. or $\frac{1}{4}$ grain.

EXTRACTUM DIGITALIS, U. S. P. VIII. Deleted.

EXTRACTUM ERGOTÆ, U. S. P. IX.

Ext. Ergot.

Extract of Ergot. Official in European Pharmacopœias as *Extractum Secalis Cornuti* (E). A pilular extract of the alcohol (85%) soluble constituents of ergot, previously exhausted with purified benzin.

Average dose: 0.25 gm. or 4 grains.

EXTRACTUM ERGOTÆ AQUOSUM, N. F. IV. New. Ext. Ergot. Aq.

Aqueous Extract of Ergot, Ergotin, P. I. Ergot extracted with chloroform water. Concentrated extract treated with alcohol and evaporated to a pilular consistence.

Average dose: 0.2 gm. or 3 grains.

EXTRACTUM EUONYMI, N. F. IV. From U. S. P. VIII.

Ext. Euonymi.

Extract of Euonymus, Powdered Extract of Euonymus; 1 gram represents 4 grams of euonymus extracted with a mixture of alcohol (4) and water (1).

Average dose: 0.125 gm. or 2 grains. To be administered with caution.

EXTRACTUM FELLIS BOVIS, U. S. P. IX.

Ext. Fel. Bov.

Extract of Oxgall, *Fel Bovis Purificatum*, U. S. P. VIII. Powdered Extract of Oxgall. One gram of the extract represents the alcohol-soluble constituents of 8 grams of oxgall.

Average dose: 0.1 gm. or $1\frac{1}{4}$ grains.

EXTRACTUM FERRI POMATUM, N. F. IV. Ext. Ferr. Pomat.

Ferrated Extract of Apples, Ferri Malas Crudus, Crude Malate of Iron. Reduced iron treated with fresh apple juice by means of heat. The resulting product filtered and evaporated to the consistence of a thick syrup.

Average dose: 0.65 gm. or 10 grains.

Preparation: N. F.—Tinctura Ferri Pomata.

EXTRACTUM GELSEMI, U. S. P. IX. New. Ext. Gelsem.

Extract of Gelsemium, Powdered Extract of Gelsemium. One gram of the powdered extract represents the alcohol-soluble constituents of four grams of gelsemium.

Average dose: 0.01 gm. or $\frac{1}{4}$ grain.

EXTRACTUM GENTIANÆ, U. S. P. IX. Ext. Gentian.

Extract of Gentian. A pilular extract representing the water-soluble constituents of gentian.

Average dose: 0.25 gm. or 4 grains.

Preparations: N. F.—Pilulæ Antiperiodicæ, Pilulæ Antiperiodicæ sine Aloe, Pilulæ Ferri Quininæ Aloes et Nucis Vomicae, Pilulæ ad Prandium.

EXTRACTUM GLYCYRRHIZÆ, U. S. P. IX. Ext. Glycyrrh.

Extract of Glycyrrhiza, Extract of Licorice. The commercial Extract of Glycyrrhiza. Official in European pharmacopœias as Extractum Liquoritiæ Venale (E). Commercial extract of glycyrrhiza is 60 per cent soluble in cold water and yields on incineration not exceeding 6 per cent of ash.

Preparations: U. S. P.—Trochisci Ammonii Chloridi, Trochisci Cubebæ.

EXTRACTUM GLYCYRRHIZÆ DEPURATUM, N. F. III. Deleted.

EXTRACTUM GLYCYRRHIZÆ PURUM, U. S. P. IX.

Ext. Glycyrrh. Pur.

Pure Extract of Glycyrrhiza. Official in European pharmacopœias as Extractum Liquiritiæ (E). A pilular extract of the water-soluble constituents of glycyrrhiza.

Preparations: U. S. P.—Mistura Glycyrrhizæ Composita.

N. F.—Mistura Ammonii Chloridi, Mistura Olei Picis.

EXTRACTUM HÆMATOXYLI, N. F. IV. From U. S. P. VIII.

Ext. Hæmatox.

Extract of Hematoxylon. Hematoxylon extracted with water by means of heat and extract evaporated to dryness.

Average dose: 1 gm. or 15 grains.

EXTRACTUM HYDRASTIS, U. S. P. IX. New. Ext. Hydrast.

Extract of Hydrastis, Extract of Golden Seal, Powdered Extract of Hydrastis. Yields from 9 to 11 per cent of the ether-soluble alkaloids of hydrastis. One gram represents about 4 grams of hydrastis.

Average dose: 0.5 gm. or 8 grains.

EXTRACTUM HYOSCYAMI, U. S. P. IX. Ext. Hyosc.

Extract of Hyoscyamus, included in the International Protocol as Hyoscyami Extractum (P. I.). A pilular extract of the alcohol (75 per cent) soluble constituents of hyoscyamus. Yields from 0.215 to 0.288 per cent of the alkaloids of hyoscyamus. One gram of the extract represents about 4 grams of the drug. Method of assay.

Preparations: N. F.—Mistura Chlorali et Potassii Bromidi Composita, Pilulæ Antineuralgicæ, Pilulæ Catharticæ Vegetabiles, Pilulæ Colocynthis et Hyoscyamus, Pilulæ Laxativæ Post Partum.

EXTRACTUM IGNATLÆ, N. F. IV. New. Ext. Ignat.

Extract of Ignatia. Yields from 5.4 to 6.6 per cent of total alkaloids of ignatia. Ignatia extracted with a mixture of alcohol (3) and water (1).

Average dose: 0.03 gm. or $\frac{1}{4}$ grain.

EXTRACTUM IRIDIS, N. F. III. Deleted.

EXTRACTUM JALAPÆ, N. F. IV. Ext. Jalap.

Extract of Jalap. The alcohol soluble extractive of jalap.

Average dose: 1 gm. or 15 grains.

EXTRACTUM JUGLANDIS, N. F. III. Deleted.

EXTRACTUM KRAMERLÆ, N. F. IV. From U. S. P. VIII.

Ext. Kramer.

Extract of Krameria. The water-soluble extract of krameria (1-4).

Average dose: 0.5 gm. or 8 grains.

EXTRACTUM LEPTANDRÆ, N. F. IV. From U. S. P. VIII.

Ext. Leptand.

Extract of Leptandra. Powdered Extract of Leptandra. An extract (1 = 4) made by percolating leptandra with a mixture of alcohol (3) and water (1).

Average dose: 0.25 gm. or 4 grains.

EXTRACTUM MALTI, U. S. P. IX. Ext. Malt.

Extract of Malt. A semi-solid extract representing the water-soluble constituents of malt. Specific gravity from 1.350 to 1.400 at 25°.

Average dose: 15 gm. or 4 drachms.

Preparation: N. F.—Emulsum Olei Morrhue cum Malti.

EXTRACTUM MALTI CUM OLEO MORRHUE, N. F. III. See Emulsum Olei, Morrhue cum Malti, N. F. IV.

EXTRACTUM NUCIS VOMICÆ, U. S. P. IX. Ext. Nuc. Vom.

Extract of Nux Vomica, Powdered Extract of Nux Vomica. Included in the International Protocol as Extractum Strychni or Nucis Vomicæ Extractum (P. I.). Yields from 15.2 to 16.8 per cent of the alkaloids of nux vomica. Method of assay.

Average dose: 0.015 gm. or $\frac{1}{4}$ grain.

Preparations: N. F.—Pilulæ Aloes et Podophylli Compositæ, Pilulæ Ferri, Quininæ, Aloes et Nucis Vomicæ, Pilulæ Laxativæ Post Partum.

EXTRACTUM OPII, U. S. P. IX. Ext. Opii.

Extract of Opium, Powdered Extract of Opium. Included in the International Protocol as Opii Extractum (P. I.). Yields from 19.5 to 20.5 per cent of anhydrous morphine. One gram of the extract represents about 2 grams of opium. Method of assay.

Average dose: 0.03 gm. or $\frac{1}{2}$ grain.

EXTRACTUM PHYSOSTIGMATIS, U. S. P. IX. Ext. Physostig.

Extract of Physostigma, Powdered Extract of Physostigma. Yields from 1.7 to 2.3 per cent of the alkaloids of physostigma. One gram represents the alcohol-soluble constituents of about 13 grams of physostigma. Method of assay.

Average dose: 0.008 gm. or $\frac{1}{8}$ grain.

EXTRACTUM PODOPHYLLI, N. F. IV. Ext. Podophyl.

Extract of Podophyllum, Extract of Mayapple. Made by extracting podophyllum with a mixture of alcohol (4) and water (1) and evaporating the resulting extract to pilular consistence.

Average dose: 0.015 gm. or $\frac{1}{4}$ grain.

EXTRACTUM QUASSIÆ, N. F. IV. From U. S. P. VIII. Ext. Quass.

Extract of Quassia. An aqueous extract (1 = 10) of quassia.

Average dose: 0.06 gm. or 1 grain.

EXTRACTUM RHAMNI PURSHIANÆ, U. S. P. VIII. See Extractum Cascaræ Sagradæ, U. S. P. IX.

EXTRACTUM RHEI, U. S. P. IX. Ext. Rhei.

Extract of Rhubarb, Powdered Extract of Rhubarb. One gram represents 2 grams of rhubarb.

Average dose: 0.25 gm. or 4 grains.

EXTRACTUM SCOPOLÆ, U. S. P. VIII. Deleted.

EXTRACTUM STRAMONII, U. S. P. IX. Ext. Stramon.

Extract of Stramonium. A pilular and a powdered extract required to yield from 0.9 to 1.1 per cent of the alkaloids of stramonium. One gram represents about 4 grams of the drug. Method of assay.

Average dose: 0.01 gm. or $\frac{1}{8}$ grain.

Preparation: U. S. P.—Unguentum Stramonii (from pilular ext.).

EXTRACTUM STRAMONII SEMINIS, N. F. III. Deleted.

EXTRACTUM SUMBUL, U. S. P. IX. Ext. Sumbul.

Extract of Sumbul. The alcohol-soluble constituents of sumbul.

Average dose: 0.25 gm. or 4 grains.

EXTRACTUM TARAXACI, U. S. P. IX. Ext. Tarax.

Extract of Taraxacum. An alcohol (25 per cent) soluble extract of taraxacum of pilular consistence.

Average dose: 1 gm. or 15 grains.

EXTRACTUM UVÆ URSI, N. F. III. Deleted.

EXTRACTUM VIBURNI PRUNIFOLII, U. S. P. IX. New.

Ext. Viburn. Prun.

Extract of Viburnum Prunifolium, Powdered Extract of Viburnum Prunifolium. Made with diluted alcohol. One gram of the extract represents 5 grams of viburnum prunifolium.

Average dose: 0.5 gm. or 8 grains.

FARFARA, N. F. IV. Part II. Farfar.

Coltsfoot, Coltsfoot Leaves, Tussilago Leaves. The dried leaves of *Tussilago farfara* Linné, without the presence or admixture of more than 5 per cent of the other parts of the plant. Yields not more than 20 per cent of ash.

Average dose: 4 gm. or 1 drachm.

Preparation: N. F.—Species Pectorales.

FEL BOVIS, U. S. P. IX. Fel. Bovis.

Oxgall. The fresh bile of the ox *Bos taurus* Linné.

Preparation: U. S. P.—Extractum Fellis Bovis.

FEL BOVIS PURIFICATUM, U. S. P. VIII. See Extractum Fellis Bovis, U. S. P. IX.

FERRI CARBONAS SACCHARATUS, U. S. P. IX. Ferr. Carb. Sacch.

Saccharated Ferrous Carbonate. Official in European pharmacopœias as *Ferrum Carbonicum Saccharatum* (E). Contains not less than 15 per cent of FeCO_3 . Made by decomposing ferrous sulphate with sodium bicarbonate. Tests for identity and purity and a method of assay.

Average dose: 0.25 gm. or 4 grains.

FERRI CHLORIDUM, U. S. P. IX. Ferr. Chlor.

Ferric Chloride. Iron Perchloride. Official in European pharmacopœias as *Ferrum Sesquichloratum* (E), *Chloretum Ferricum* (S). Contains FeCl_3 in a hydrated form corresponding to not less than 20 per cent of Fe. Tests for identity and purity and a method of assay.

Average dose: 0.06 gm. or 1 grain.

FERRI CITRAS, U. S. P. VIII. Deleted.

FERRI ET AMMONII CITRAS, U. S. P. IX. Ferr. et Ammon. Cit.

Iron and Ammonium Citrate, Soluble Ferric Citrate, Ammonio-Ferric Citrate. Official in European pharmacopœias as Citras Ferrico-Ammonicus (S). Iron citrate rendered more readily soluble by the presence of ammonium citrate and containing from 16 to 18 per cent of Fe. Tests for identity and purity and a method of assay.

Average dose: 0.25 gm. or 4 grains.

Preparations: N. F.—Vinum Carnis et Ferri, Vinum Ferri.

FERRI ET AMMONII SULPHAS, U. S. P. VIII. Deleted

FERRI ET AMMONII TARTRAS, U. S. P. VIII. Deleted.

FERRI ET POTASSII TARTRAS, U. S. P. VIII. Deleted.

FERRI ET QUININÆ CITRAS, U. S. P. VIII. Deleted.

FERRI ET QUININÆ CITRAS, U. S. P. IX. Ferr. et Quin. Cit.

Iron and Quinine Citrate, Soluble Iron and Quinine Citrate, Ferri et Quininæ Citras Solubilis, U. S. P. VIII. Official in European pharmacopœias as Chininum Ferro-Citricum (E), Citras Ferricus cum Chinina (S). Iron citrate and quinine citrate rendered more soluble by the presence of ammonium citrate and containing not less than 11.5 per cent of anhydrous quinine and not less than 13 per cent of Fe. Tests for identity and purity and a method of assay for quinine and for iron.

Average dose: 0.25 gm. or 4 grains.

Preparation: N. F.—Vinum Ferri Amarum.

FERRI ET QUININÆ CITRAS SOLUBILIS, U. S. P. VIII. See Ferri et Quininæ Citras, U. S. P. IX.

FERRI ET STRYCHNINÆ CITRAS, U. S. P. VIII. Deleted.

FERRI GLYCEROPHOSPHAS, N. F. IV. Part II. Ferr. Glycerophos.

Ferric Glycerophosphate, Ferric Glycerinophosphate. Contains a variable quantity of $\text{Fe}_2(\text{C}_3\text{H}_5\text{O}_4\text{P})_2$, corresponding to from 14 to 16 per cent of Fe. Tests for identity and purity and a method of assay.

Average dose: 0.2 gm. or 3 grains.

Preparation: N. F.—Elixir Glycerophosphatum Compositum.

FERRI HYDROXIDUM, U. S. P. VIII. See Magma Ferri Hydroxidi, N. F. IV.

FERRI HYDROXIDUM CUM MAGNESII OXIDO, U. S. P. IX.

Ferr. Hydrox. cum Mag. Oxid.

Ferric Hydroxide with Magnesium Oxide, Arsenic Antidote, Ferric Hydrate with Magnesia. Official in European pharmacopœias as Antidotum Arsenici (E). A diluted solution of ferric sulphate and a mixture of magnesium oxide with water to be mixed when wanted.

Average dose: 120 mils or 4 fluidounces.

FERRI HYPOPHOSPHIS, N. F. III. Deleted.

FERRI HYPOPHOSPHIS, N. F. IV. Part II. From U. S. P. VIII.

Ferr. Hypophos.

Ferric Hypophosphite. Contains not less than 98 per cent of $\text{Fe}(\text{PH}_2\text{O}_2)_2$, corresponding to not less than 21.8 per cent of Fe. Tests for identity and purity and a method of assay.

Average dose: 0.2 gm. or 3 grains.

Preparations: N. F.—Elixir Ferri Hypophosphitis, Elixir Hypophosphitum et Ferro, Liquor Ferri Hypophosphitis, Liquor Hypophosphitum Compositus, Syrupus Ferri Hypophosphitis, Syrupus Hypophosphitum Compositus.

FERRI IODIDUM SACCHARATUM, N. F. III. Deleted.

FERRI LACTAS N. F. Part II.

Ferr. Lact.

Ferrous Lactate, Iron Lactate. Contains not less than 97 per cent of $\text{Fe}(\text{C}_2\text{H}_3\text{O}_2)_2 + 3\text{H}_2\text{O}$. Tests for identity and purity and a method of assay.

Average dose: 0.3 gm. or 5 grains.

Preparations: N. F.—Elixir Ferri Lactatis, Syrupus Calcii Lactophosphatis cum Ferro, Syrupus Ferri Lactophosphatis.

FERRI OXIDUM SACCHARATUM, N. F. IV. New. Ferr. Oxid. Sacch.

Saccharated Ferric Oxide, Soluble Ferric Oxide. Ferrum Oxidatum Saccharatum (G. P.), Eisenzucker. Contains the equivalent of not less than 2.8 per cent of Fe. Method of assay.

Preparation: N. F.—Syrupus Ferri Saccharati Solubilis.

FERRI PHOSPHAS, U. S. P. IX.

Ferr. Phos.

Ferric Phosphate, Ferri Phosphas Solubilis, U. S. P. VIII, Soluble Ferric Phosphate. Ferric phosphate rendered soluble by the presence of sodium citrate. Contains not less than 12 per cent of Fe. Tests for identity and purity and a method of assay.

Average dose: 0.25 gm. or 4 grains.

Preparations: N. F.—Elixir Cinchonæ Alkaloidarum et Ferri, Elixir Ferri Phosphatis, Elixir Gentianæ et Ferri Phosphatis, Liquor Phosphatum Compositus, Syrupus Ferri Quininæ et Strychninæ Phosphatum.

FERRI PHOSPHAS SOLUBILIS, U. S. P. VIII. See Ferri Phosphas, U. S. P. IX.

FERRI PYROPHOSPHAS, N. F. IV. Part II. From U. S. P. VIII.

Ferr. Pyrophos.

Ferric Pyrophosphate, Soluble Ferric Pyrophosphate. Contains ferric pyrophosphate corresponding to not less than 10 per cent of iron. Tests for identity and purity and a method of assay.

Average dose: 0.25 gm. or 4 grains.

Preparations: NF.—Elixir Ferri Pyrophosphatis, Elixir Ferri Pyrophosphatis, Quininæ et Strychninæ.

FERRI PYROPHOSPHAS SOLUBILIS, U. S. P. VIII. See Ferri Pyrophosphas, N. F. IV.

FERRI SULPHAS, U. S. P. IX.

Ferr. Sulph.

Ferrous Sulphate, Iron Proto-sulphate. Official in European pharmacopœias as Ferrum Sulfuricum (E), Sulfas Ferrosus (S). Contains from 54.36 to 57.07 per cent of anhydrous ferrous sulphate. Corresponding to not less than 99.5 per cent of the crystallized salt, $\text{FeSO}_4 + 7\text{H}_2\text{O}$. Tests for identity and purity and a method of assay.

Average dose: 0.1 gm. or $1\frac{1}{2}$ grains.

Preparations: U. S. P.—Ferri Sulphas Exsiccatus (which see) Ferri Sulphas Granulatus (which see) used in making Ferri Carbonas Saccharatus, Liquor Ferri Subsulphatis, Liquor Ferri Tersulphatis, Massa Ferri Carbonatis.

N. F.—Used in making: Liquor Ferri Oxysulphatis, Liquor Zinci et Ferri Compositus, Mistura Ferri Composita.

FERRI SULPHAS EXSICCATUS, U. S. P. IX.

Ferr. Sulph. Exsic.

Exsiccated Ferrous Sulphate, Dried Ferrous Sulphate. Official in European pharmacopœias as Ferrum Sulfuricum Siccum (E); Sulfas Ferrosus Siccatus (S). Contains not less than 80 per cent of the anhydrous salt (FeSO_4). Tests for identity and purity and a method of assay.

Average dose: 0.06 gm. or 1 grain.

Preparations: N. F.—Pilulæ Aloes et Ferri, Pilulæ Ferri, Quininæ, Aloes, et Nucis Vomiceæ.

FERRI SULPHAS GRANULATUS, U. S. P. IX.

Ferr. Sulph. Gran.

Granulated Ferrous Sulphate, Precipitated Ferrous Sulphate. Official in European pharmacopœias as Ferrum Sulfuricum Præcipitatum (E). Crystallized ferrous sulphate in granular form. The product complies with the requirements and tests for purity given under ferri sulphas.

Average dose: 0.1 gm. or $1\frac{1}{2}$ grains.

Preparation: U. S. P.—Used in making: Pilulæ Ferri Carbonatis.

FERRUM, U. S. P. IX.

Ferr.

Iron. Metallic iron in the form of fine, bright, and nonelastic wire.

Preparations: U. S. P.—Used in making: Liquor Ferri Chloridi Syrupus Ferri Iodidi.

N. F.—Used in making: Extractum Ferri Pomatum, Liquor Ferri Protochloridi, Syrupus Calcii Iodidi, Syrupus Ferri et Mangani Iodidi.

FERRUM REDUCTUM, U. S. P. IX.

Ferr. Reduct.

Reduced Iron, Ferrum Redactum, Iron by Hydrogen., Quevenne's Iron. Official in European pharmacopœias as Ferrum Redactum (E). Iron reduced to the metallic state by the action of hydrogen upon ferric oxide. Contains not less than 90 per cent of metallic iron. Tests for identity and purity and a method of assay.

Average dose: 0.06 gm. or 1 grain.

Preparation: U. S. P.—Used in making: *Pilulæ Ferri Iodidi*.

N. F.—*Pilulæ Ferri, Quininæ, Strychninæ et Arseni Fortiores, Pilulæ Ferri, Quininæ, Strychninæ et Arseni Mites*.

FICUS, N. F. IV. Part II. From U. S. P. VIII.

Ficus.

Fig. The partially dried fruit of *Ficus carica* Linné.

Preparations: N. F.—*Confectio Sennæ, Syrupus Ficorum Compositus*.

FLUIDEXTRACTA, U. S. P. IX. N. F. IV.

Fluidextracts. General directions and formulas for making fluid-extracts.

FLUIDEXTRACTUM ACONITI, U. S. P. IX.

Fldext. Aconit.

Fluidextract of Aconite, Fluid Extract of Aconite. Yields from 0.45 to 0.55 w/v per cent of the ether soluble alkaloids of aconite. Made by extracting aconite with a mixture of alcohol (3) and water (1). Method of assay. Also biological assay.

Average dose: 0.03 mil or $\frac{1}{4}$ minim.

Preparation: N. F.—*Linimentum Aconiti et Chloroformi*.

FLUIDEXTRACTUM ADONIDIS, N. F. IV.

Fldext. Adonid.

Fluidextract of Adonis. Made with a mixture of alcohol (3) and water (1).

Average dose: 0.125 mil or 2 minims.

FLUIDEXTRACTUM ALETRIDIS, N. F. IV.

Fldext. Aletrid.

Fluidextract of Aletris. Made with diluted alcohol.

Average dose: 2 mils or 30 minims.

FLUIDEXTRACTUM ANGELICÆ RADICIS, N. F.

Fldext. Angel. Rad.

Fluidextract of Angelica Root. Made with alcohol.

Average dose: 2 mils or 30 minims.

FLUIDEXTRACTUM APII GRAVEOLENTIS, N. F. III. See Fluidextractum Apii Fructi, N. F. IV.**FLUIDEXTRACTUM APII FRUCTUS, N. F. III.**

Fldext. Apii. Fruct.

Fluidextract of Celery Fruit. Made with alcohol.

Average dose: 2 mils or 30 minims.

FLUIDEXTRACTUM APOCYNÏ, N. F. IV. From U. S. P. VIII.

Fldext. Apocyn.

Fluidextract of Apocynum, Fluid Extract of Apocynum, Fluid Extract of Canadian Hemp. Made with a mixture of glycerin (1), alcohol (6), and water (3), Biological method of assay.

Average dose: 0.75 mil or 12 minims, to be administered with caution.

FLUIDEXTRACTUM ARALIE, N. F. IV.

Fldext. Aral.

Fluidextract of Aralia. Made with a mixture of alcohol (2) and water (1).

Average dose: 1 mil or 15 minims.

FLUIDEXTRACTUM ARALIE RACEMOSÆ, N. F. III. See Fluidextractum Araliæ, N. F. IV.

FLUIDEXTRACTUM ARNICÆ, N. F. IV.

Fldext. Arnica.

Fluidextract of Arnica, Fluidextract of Arnica Flowers. Made with diluted alcohol.

Average dose: 1 mil or 15 minims.

FLUIDEXTRACTUM ARNICÆ FLORUM, N. F. III. See Fluidextractum Arnicæ, N. F. IV.

FLUIDEXTRACTUM ARNICÆ RADICIS, N. F. III. Deleted.

FLUIDEXTRACTUM AROMATICUM, U. S. P. IX.

Fldext. Aromat.

Aromatic Fluidextract, Aromatic Fluid Extract. Aromatic powder extracted with alcohol.

Average dose: 1 mil or 15 minims.

FLUIDEXTRACTUM ASCLEPIADIS, N. F. IV.

Fldext. Asclepiad.

Fluidextract of Asclepias. Made with diluted alcohol.

Average dose: 2 mils or 30 minims.

FLUIDEXTRACTUM ASPIDOSPERMATIS, U. S. P. IX. From N. F. III.

Fldext. Aspidosp.

Fluidextract of Aspidosperma, Fluid Extract of Aspidosperma, Fluidextract of Quebracho. Aspidosperma extracted with a mixture of glycerin (11), alcohol (67), and water (22).

Average dose: 4 mils or 1 fluidrachm.

FLUIDEXTRACTUM AURANTII AMARI, U. S. P. IX.

Fldext. Aurant. Amar.

Fluidextract of Bitter Orange Peel, Fluid Extract of Bitter Orange Peel. Bitter orange peel extracted with a mixture of alcohol (3) and water (1).

Average dose: 1 mil or 15 minims.

Preparation: N. F.—Vinum Rhei Compositum.

FLUIDEXTRACTUM BAPTISÆ N. F. IV. New. Fldext. Baptis.

Fluidextract of Baptisia. Made with a mixture of alcohol (3) and water (1).

Average dose: 1 mil or 15 minims.

FLUIDEXTRACTUM BELLADONNÆ RADICIS, U. S. P. IX.

Fldext. Bellad. Rad.

Fluidextract of Belladonna Root, Fluid Extract of Belladonna Root. Yields from 0.405 to 0.495 w/v per cent of the alkaloids of belladonna root. Made by extracting belladonna root with a mixture of alcohol (5) and water (1). Method of assay.

Average dose: 0.05 mil or 1 minim.

Preparation: U. S. P.—Linimentum Belladonnæ.

FLUIDEXTRACTUM BERBERIDIS, N. F. IV. From U. S. P. VIII.

Fldext. Berberid.

Fluidextract of Berberis. Made with diluted alcohol.

Average dose: 2 mils or 30 minims.

FLUIDEXTRACTUM BOLDI, N. F. IV.

Fldext. Boldi.

Fluidextract of Boldo. Made with alcohol.

Average dose: 0.5 mil or 8 minims.

FLUIDEXTRACTUM BUCHU, U. S. P. IX.

Fldext. Buchu.

Fluidextract of Buchu, Fluid Extract of Buchu. Made by extracting buchu with alcohol.

Average dose: 2 mils or 30 minims.

Preparation: N. F.—Elixir Buchu. (Which see.)

FLUIDEXTRACTUM BUCHU COMPOSITUM, N. F. IV.

Fldext. Buchu Co.

Compound Fluidextract of Buchu. A mixture of buchu (62.5), cubeb (12.5), juniper (12.5), and uva ursi (12.5) extracted with a mixture of alcohol (2) and water (1).

Average dose: 2 mils or 30 minims.

Preparation: N. F.—Elixir Buchu Compositum.

FLUIDEXTRACTUM CALAMI, U. S. P. VIII. Deleted.

FLUIDEXTRACTUM CALENDULÆ, N. F. IV.

Fldext. Calend.

Fluidextract of Calendula. Made with alcohol.

FLUIDEXTRACTUM CALUMBÆ, N. F. IV. From U. S. P. VIII.

Fldext. Calumb.

Fluidextract of Calumba. Made with a mixture of alcohol (8), glycerin (1) and water (1).

Average dose: 2 mils or 30 minims.

FLUIDEXTRACTUM CAMELLIÆ, N. F. III. Deleted.

FLUIDEXTRACTUM CANNABIS, U. S. P. IX. Fldext. Cannab.

Fluidextract of Cannabis. Fluid Extract of Cannabis. Made by extracting cannabis with alcohol. A biological assay.

Average dose: 0.1 mil or 1½ minims.

Preparation: N. F.—Collodium Salicyli Compositum.

FLUIDEXTRACTUM CANNABIS INDICÆ, U. S. P. VIII. See Fluid-extractum Cannabis, U. S. P. IX.

FLUIDEXTRACTUM CAPSICI, U. S. P. VIII. Deleted.

FLUIDEXTRACTUM CASCARÆ SAGRADÆ, U. S. P. IX.

Fldext. Cascar. Sagr.

Fluidextract of Cascara Sagrada. Fluid Extract of Cascara, Fluidextractum Rhamni Purshianæ, U. S. P. VIII. Official in European pharmacopœias as Extractum Rhamni Purshianæ Fluidum (E). Cascara Sagrada extracted with boiling water and the resulting concentrated extract preserved by the addition of alcohol (25 v. per cent).

Average dose: 1 mil or 15 minims.

FLUIDEXTRACTUM CASCARÆ SAGRADÆ AROMATICUM, U. S. P. IX.

Fldext. Cascar. Sagr. Arom.

Aromatic Fluidextract of Cascara Sagrada, Aromatic Fluid Extract of Cascara Sagrada, Fluidextractum Rhamni Purshianæ Aromaticum, U. S. P. VIII. A mixture of Cascara Sagrada with magnesium oxide extracted with boiling water. Preserved with glycerin and aromatized and sweetened with oil of anise, oil of coriander, methyl salicylate and benzosulphinide.

Average dose: 2 mils or 30 minims.

Preparations: N. F.—Elixir Cascaræ Sagradæ, Elixir Cascaræ Sagradæ Compositum.

FLUIDEXTRACTUM CASTANÆ, N. F. IV. Fldext. Castan.

Fluidextract of Chestnut Leaves. Extracted with boiling water. The concentrated extract precipitated with alcohol and preserved by the addition of glycerin and alcohol.

Average dose: 4 mils or 1 fluidrachm.

FLUIDEXTRACTUM CATARLÆ, N. F. IV. New. Fldext. Catar.

Fluidextract of Catnep. Made with a mixture of alcohol (3) and water (4).

Average dose: 4 mils or 1 fluidrachm.

FLUIDEXTRACTUM CAULOPHYLLI, N. F. IV. Fldext. Caulophyll.

Fluidextract of Caulophyllum. Made with a mixture of alcohol (3) and water (1).

Average dose: 0.5 mil or 8 minims.

FLUIDEXTRACTUM CHIMAPHILÆ, N. F. IV. From U. S. P. VIII.

Fldext. Chimaphil.

Fluidextract of Chimaphila. Made with diluted alcohol.

Average dose: 2 mils or 30 minims.

FLUIDEXTRACTUM CHIONANTHI, N. F. IV. New.

Fldext. Chionanth.

Fluidextract of Chionanthus. Made with a mixture of alcohol (3) and water (1).

Average dose: 2 mils or 30 minims.

FLUIDEXTRACTUM CHIRATÆ, N. F. IV. From U. S. P. VIII.

Fldext. Chirat.

Fluidextract of Chirata. Made with diluted alcohol.

Average dose: 1 mil or 15 minims.

FLUIDEXTRACTUM CIMICIFUGÆ, U. S. P. IX.

Fldext. Cimicif.

Fluidextract of Cimicifuga, Fluid Extract of Cimicifuga, Fluidextract of Black Cohosh, Fluidextract of Black Snake Root. Cimicifuga extracted with alcohol.

Average dose: 1 mil or 15 minims.

Preparations: N. F.—Elixir Sodii Salicylatis Compositum, Syrupus Cimicifugæ Compositus.

FLUIDEXTRACTUM CINCHONÆ, U. S. P. IX.

Fldext. Cinchon.

Fluidextract of Cinchona, Fluid Extract of Cinchona, Fluidextract of Calisaya Bark. Official in European pharmacopœias as Extractum Chinæ Fluidum (E). Yields from 4.5 to 5.5 w/v per cent of the alkaloids of cinchona. Made with a mixture of glycerin (1), diluted hydrochloric acid (1), and alcohol (8). Method of assay.

Average dose: 1 mil or 15 minims.

FLUIDEXTRACTUM CINCHONÆ AQUOSUM, N. F. IV. New.

Fldext. Cinchon. Aq.

Aqueous Fluidextract of Cinchona. Yields from 4.5 to 5.5 w/v per cent of the alkaloids of cinchona. Red cinchona extracted with a mixture of hydrochloric acid (3), glycerin (12.5) and water. Concentrated extractive preserved by the addition of alcohol. Method of assay.

Average dose: 1 mil or 15 minims.

FLUIDEXTRACTUM COCÆ, U. S. P. VIII. Deleted.

FLUIDEXTRACTUM COCILLANÆ, N. F. IV. New.

Fldext. Cocillan.

Fluidextract of Cocillana. Made with a mixture of alcohol (3) and water (1).

Average dose: 1 mil. or 15 minims.

FLUIDEXTRACTUM COFFÆ, N. F. IV.

Fldext. Coff.

Fluidextract of Coffee, Fluidextractum Coffæ Tostæ, N. F. III.

Made with a mixture of glycerin (6.5), alcohol (2.5), and water (6.85).

Average dose: 2 mils or 30 minims.

FLUIDEXTRACTUM COFFÆ TOSTÆ, N. F. III. See Fluidextractum Coffæ, N. F. IV.

FLUIDEXTRACTUM COFFÆ VIRIDIS, N. F. III. Deleted.

FLUIDEXTRACTUM COLCHICI CORMI, N. F. IV. Fldext. Colch. Corm.

Fluidextract of Colchicum Corm, Fluidextract of Colchici Radicis,

N. F. III. Yields from 0.31 to 0.39 w/v per cent of colchicine.

Made with a mixture of alcohol (2) and water (1). Method of assay.

Average dose: 0.2 mil or 3 minims.

FLUIDEXTRACTUM COLCHICI SEMINIS, U. S. P. IX. Fldext. Colch. Sem.

Fluidextract of Colchicum Seed, Fluid Extract of Colchicum Seed.

Yields from 0.36 to 0.44 per cent of colchicine. Made with a mixture of alcohol (2) and water (1). Method of assay.

Average dose: 0.02 mil or 3 minims.

Preparation: N. F.—Vinum Colchici Seminis.

FLUIDEXTRACTUM CONDURANGO, N. F. IV. New.

Fldext. Condurango.

Fluidextract of Condurango. Made with diluted alcohol.

Average dose: 4 mils or 1 fluidrachm.

FLUIDEXTRACTUM CONII, N. F. IV. From U. S. P. VIII.

Fldext. Conii.

Fluidextract of Conium. Yields from 0.35 to 0.45 w/v per cent of

coniine. Made with a mixture of acetic acid (2) and diluted alcohol (98). Method of assay.

Average dose: 0.2 mil or 3 minims.

FLUIDEXTRACTUM CONVALLARIÆ, U. S. P. VIII. See Fluidextractum Convallariæ Radicis, N. F. IV.

FLUIDEXTRACTUM CONVALLARIÆ FLORUM, N. F. IV.

Fldext. Conval. Flor.

Fluidextract of Convallaria Flowers. Made with a mixture of alcohol (2) and water (1).

Average dose: 0.5 mil or 8 minims.

FLUIDEXTRACTUM CONVALLARIÆ RADICIS, N. F. IV. From U. S. P. VIII.

Fldext. Conval. Rad.

Fluidextract of Convallaria Root, Fluidextractum Convallariæ, U. S. P. VIII, Fluidextractum Convallaria, U. S. P. VIII. Made with a mixture of alcohol (3) and water (1).

Average dose: 0.5 mil or 8 minims.

- FLUIDEXTRACTUM COPTIS**, N. F. IV. Fldext. Copt.
 Fluidextract of Coptis. Made with diluted alcohol.
 Average dose: 2 mils or 30 minims.
- FLUIDEXTRACTUM CORNI**, N. F. IV. Fldext. Corni.
 Fluidextract of Cornus. Made with a mixture of glycerin (15) and diluted alcohol (85).
 Average dose: 2 mils or 30 minims.
- FLUIDEXTRACTUM CORNUS CIRCINATÆ**, N. F. III. Deleted.
- FLUIDEXTRACTUM CORYDALIS**, N. F. IV. Fldext. Corydal.
 Fluidextract of Corydalis. Made from a mixture of alcohol (2) and water (1).
 Average dose: 0.65 mil or 10 minims.
 Preparations: N. F.—Elixir Corydalis Compositum, Elixir Viburni Opuli Compositum.
- FLUIDEXTRACTUM COTO**, N. F. III. See Fluidextractum Para Coto, N. F. IV.
- FLUIDEXTRACTUM CUBEÆ**, N. F. IV. From U. S. P. VIII. Fldext. Cubeb.
 Fluidextract of Cubeb. Made with alcohol.
 Average dose: 1 mil or 15 minims.
- FLUIDEXTRACTUM CUSO**, N. F. III. Deleted.
- FLUIDEXTRACTUM CYPRIPEDI**, N. F. IV. From U. S. P. VIII. Fldext. Cypriped.
 Fluidextract of Cypripedium. Made with diluted alcohol.
 Average dose: 1 mil or 15 minims.
- FLUIDEXTRACTUM DAMIANÆ**, N. F. IV. Fldext. Damian.
 Fluidextract of Damiana, Fluidextractum Turneræ, N. F. III. Made with a mixture of alcohol (3) and water (1).
 Average dose: 2 mils or 30 minims.
- FLUIDEXTRACTUM DIGITALIS**, U. S. P. IX. Fldext. Digital.
 Fluidextract of Digitalis, Fluid Extract of Digitalis. Made with a mixture of alcohol (5) and water (1). A biological assay.
 Average dose: 0.05 mil or 1 minim.
- FLUIDEXTRACTUM DIOSCOREÆ**, N. F. IV. New. Fldext. Dioscor.
 Fluidextract of Dioscorea. Made with a mixture of alcohol (4) and water (1).
 Average dose: 4 mils or 1 fluidrachm.
- FLUIDEXTRACTUM DROSERÆ**, N. F. IV. New. Fldext. Droser.
 Fluidextract of Drosera. Made with a mixture of alcohol (2) and water (1.).
 Average dose: 4 mils or 1 fluidrachm.

FLUIDEXTRACTUM DULCAMARÆ, N. F. IV. Fldext. Dulcam.

Fluidextract of Bittersweet. Made with diluted alcohol.

Average dose: 4 mils or 1 fluidrachm.

FLUIDEXTRACTUM ECHINACÆ, N. F. IV. New. Fldext. Echin.

Fluidextract of Echinacea. Made with a mixture of alcohol (4) and water (1).

Average dose: 1 mil or 15 minims.

FLUIDEXTRACTUM ERGOTÆ, U. S. P. IX. Fldext. Ergot.

Fluidextract of Ergot, Fluid Extract of Ergot. Included in the International Protocol as Secalis Cornuti Extractum Extractum Fluidum (P. I.). Made with a mixture of hydrochloric acid (2) and diluted alcohol (98).

Average dose: 2 mils or 30 minims.

FLUIDEXTRACTUM ERIODICTYI, U. S. P. IX. Fldext. Eriodict.

Fluidextract of Eriodictyon, Fluid Extract of Eriodictyon, Fluid-extract of Yerba Santa. Made with a mixture of alcohol (4) and water (1).

Average dose: 1 mil or 15 minims.

Preparations: N. F.—Elixir Eriodictyi Aromaticum, Syrupus Eriodictyi Aromaticus.

FLUIDEXTRACTUM EUCALYPTI, U. S. P. IX. Fldext. Eucalypt.

Fluidextract of Eucalyptus, Fluid Extract of Eucalyptus. Made with a mixture of alcohol (3) and water (1).

Average dose: 2 mils or 30 minims.

FLUIDEXTRACTUM EUONYMI, N. F. IV. From U. S. P. VIII.

Fldext. Euonym.

Fluidextract of Euonymus. Made with a mixture of alcohol (4) and water (1).

Average dose: 0.5 mil or 8 minims.

FLUIDEXTRACTUM EUPATORII, N. F. IV. From U. S. P. VIII.

Fldext. Eupator.

Fluidextract of Eupatorium. Made with diluted alcohol.

Average dose: 2 mils or 30 minims.

FLUIDEXTRACTUM EUPHORBIE PILULIFERÆ, N. F. IV. New.

Fldext. Euphorb. Pilul.

Fluidextract of Euphorbia Pilulofera. Made with diluted alcohol.

Average dose: 2 mils or 30 minims.

FLUIDEXTRACTUM FRANGULÆ, U. S. P. IX. Fldext. Frangul.

Fluidextract of Frangula, Fluid Extract of Frangula, Fluidextract of Buckthorn Bark. The water-soluble constituents of frangula. Preserved with alcohol (25 per cent).

Average dose: 1 mil or 15 minims.

Preparations: N. F.—Elixir Catharticum Compositum, Syrupus Sennæ Compositus.

FLUIDEXTRACTUM FUCI, N. F. IV. Fldext. Fuci.

Fluidextract of Fucus. Made with a mixture of alcohol (3) and water (1).

Average dose: 0.65 mil or 10 minims.

FLUIDEXTRACTUM GALEGÆ, N. F. IV. New. Fldext. Galeg.

Fluidextract of Galega. Made with diluted alcohol.

Average dose: 4 mils, or 1 fluidrachm.

FLUIDEXTRACTUM GELSEMI, U. S. P. IX. Fldext. Gelsem.

Fluidextract of Gelsemium, Fluid Extract of Gelsemium. Made with a mixture of alcohol (4) and water (1).

Average dose: 0.03 mil or $\frac{1}{4}$ minim.

Preparation: N. F.—Elixir Sodii Salicylatis Compositum.

FLUIDEXTRACTUM GENTIANÆ, U. S. P. IX. Fldext. Gent.

Fluidextract of Gentian, Fluid Extract of Gentian. Made with diluted alcohol.

Average dose: 1 mil or 15 minims.

Preparations: N. F.—Elixir Gentianæ (which see), Elixir Gentianæ Glycerinatum.

FLUIDEXTRACTUM GERANII, N. F. IV. From U. S. P. VIII.

Fldext. Geran.

Fluidextract of Geranium. Made with a mixture of glycerin (1), alcohol (6), and water (3).

Average dose: 1 mil or 15 minims.

FLUIDEXTRACTUM GLYCYRRHIZÆ, U. S. P. IX. Fldext. Glycyrrh.

Fluidextract of Glycyrrhiza, Fluid Extract of Glycyrrhiza, Fluid-extract of Licorice. The water-soluble constituents of glycyrrhiza preserved with alcohol (25 v. per cent).

Average dose: 2 mils or 30 minims.

Preparations: U. S. P.—Elixir Glycyrrhizæ, Syrupus Sarsaparillæ Compositus.

N. F.—Elixir Glycyrrhizæ Aquosum, Elixir Glycyrrhizæ Aromaticum, Elixir Taraxaci Compositum, Syrupus Cimicifuga Compositus.

FLUIDEXTRACTUM GOSSYPII CORTICIS, N. F. IV.

Fldext. Gossyp. Cort.

Fluidextract of Cotton Root Bark. Made with alcohol.

Average dose: 2 mils or 30 minims.

FLUIDEXTRACTUM GOSSYPII RADICIS, N. F. III

See Fluidextractum Gossypii Corticis, N. F.

FLUIDEXTRACTUM GRANATI, U. S. P. IX. Fldext. Granat.

Fluidextract of Pomegranate, Fluid Extract of Pomegranate. Made with a mixture of glycerin (1), alcohol (5), and water (4).

Average dose: 2 mils or 30 minims.

FLUIDEXTRACTUM GRINDELÆ, U. S. P. IX. Fldext. Grindel.

Fluidextract of Grindelia, Fluid Extract of Grindelia. Made with a mixture of alcohol (3) and water (1).

Average dose: 2 mils or 30 minims.

FLUIDEXTRACTUM GUARANÆ, U. S. P. IX. Fldext. Guaran.

Fluidextract of Guarana, Fluid Extract of Guarana. Yields from 3.6 to 4.4 w/v per cent of caffeine. Made with a mixture of alcohol (3) and water (1). Method of assay.

Average dose: 2 mils or 30 minims.

Preparation: N. F.—Elixir Guaranæ.

FLUIDEXTRACTUM HAMAMELIDIS FOLIORUM, N. F. IV. From U. S. P. VIII. Fldext. Hamamel. Fol.

Fluidextract of Hamamelis Leaves, Fluidextract of Witch Hazel Leaves. Made with a mixture of glycerin (1), alcohol (3), and water (5).

Average dose: 2 mils or 30 minims.

FLUIDEXTRACTUM HELIANTHEMI, N. F. IV. Fldext. Helianth.

Fluidextract of Helianthemum. Made with diluted alcohol.

Average dose: 4 mils or 1 fluidrachm.

FLUIDEXTRACTUM HELONIATIS, N. F. IV. New. Fldext. Helon.

Fluidextract of Helonias. Made with diluted alcohol.

Average dose: 2 mils or 30 minims.

FLUIDEXTRACTUM HUMULI, N. F. IV. Fldext. Humul.

Fluidextract of Hops, made with a mixture of alcohol (5) and water (3).

Average dose: 2 mils or 30 minims.

Preparation: N. F.—Elixir Humuli.

FLUIDEXTRACTUM HYDRANGÆ, N. F. IV. Fldext. Hydrang.

Fluidextract of Hydrangea, Fluidextract of Seven Barks. Made with a mixture of alcohol (3) and water (2).

Average dose: 2 mils or 30 minims.

FLUIDEXTRACTUM HYDRASTIS, U. S. P. IX. Fldext. Hydrast.

Fluidextract of Hydrastis, Fluid Extract of Hydrastis, Fluidextract of Golden Seal. Official in European pharmacopœias as Extractum Hydrastis Fluidum (E). Yields from 1.8 to 2.2 w/v per cent of the ether-soluble alkaloids of hydrastis. Made with a mixture of glycerin (1), alcohol (5), and water (2). Method of assay.

Average dose: 2 mils or 30 minims.

Preparation: N. F.—Mistura Rhei Alkalina.

FLUIDEXTRACTUM HYOSCYAMI, U. S. P. IX. Fldext. Hyosc.

Fluidextract of Hyoscyamus, Fluidextract of Henbane, Fluid Extract of Hyoscyamus. Yields from 0.055 to 0.075 w/v per cent of the alkaloids of hyoscyamus. Made with a mixture of alcohol (5) and water (1). Method of assay.

Average dose: 0.2 mil or 3 minims.

FLUIDEXTRACTUM IPECACUANHÆ, U. S. P. IX. Fldext. Ipecac.

Fluidextract of Ipecac, Fluid Extract of Ipecac. Official in European pharmacopœias as Extractum Ipecacuanhæ Fluidum (E). Yields from 1.8 to 2.2 w/v per cent of the ether-soluble alkaloids of ipecac. Made with a mixture of diluted hydrochloric acid (1), alcohol (2), and water (2). Method of assay.

Average dose: Expectorant 0.05 mil or 1 minim.

Preparations: U. S. P.—Syrupus Ipecacuanhæ.

N. F.—Mistura Rhei Composita, Syrupus Asari Compositus, Syrupus Cimicifugæ, Tinctura Ipecacuanhæ, Vinum Ipecacuanhæ.

FLUIDEXTRACTUM IRIDIS, N. F. III. See Fluidextractum Iridis Versicoloris, N. F.

FLUIDEXTRACTUM IRIDIS VERSICOLORIS, N. F. IV. Fldext. Irid. Vers.

Fluidextract of Iris Versicolor. Made with alcohol.

Average dose: 2 mils or 30 minims.

FLUIDEXTRACTUM JALAPÆ, N. F. IV.

Fldext. Jalap.

Fluidextract of Jalap. Made with alcohol.

Average dose: 1 mil or 15 minims.

FLUIDEXTRACTUM JUGLANDIS, N. F. IV.

Fldext. Jugland.

Fluidextract of Juglans. Made with a mixture of alcohol (5), glycerin (1), and water (4).

Average dose: 4 mils or 1 fluidrachm.

FLUIDEXTRACTUM JUNIPERI, N. F. IV.

Fldext. Junip.

Fluidextract of Juniper Berries. Made with diluted alcohol.

Average dose: 4 mils or 1 fluidrachm.

Preparation: N. F.—Elixir Potassii Acetatis et Juniperi.

FLUIDEXTRACTUM KAVÆ, N. F. IV.

Fldext. Kav.

Fluidextract of Kava. Made with a mixture of alcohol (3) and water (2).

Average dose: 1 mil or 15 minims.

FLUIDEXTRACTUM KOLÆ, N. F. IV.

Fldext. Kol.

Fluidextract of Kola, Fluidextractum Sterculiæ, N. F. III. Made with a mixture of alcohol (2) and water (1).

Average dose: 4 mils or 1 fluidrachm.

FLUIDEXTRACTUM KRAMERIÆ, N. F. IV. From U. S. P. VIII.

Fldext. Kramer.

Fluidextract of Krameria. Made with a mixture of glycerin (1), alcohol (5), and water (4).

Average dose: 1 mil or 15 minims.

FLUIDEXTRACTUM LAPPÆ, N. F. IV. From U. S. P. VIII.

Fldext. Lapp.

Fluidextractum of Lappa. Made with diluted alcohol.

Average dose: 2 mils or 30 minims.

FLUIDEXTRACTUM LEPTANDRÆ, N. F. IV. From U. S. P. VIII.

Fldext. Leptand.

Fluidextract of Leptandra. Made with diluted alcohol.

Average dose: 1 mil or 15 minims.

FLUIDEXTRACTUM LOBELIÆ, U. S. P. IX.

Fldext. Lobel.

Fluidextract of Lobelia, Fluid Extract of Lobelia. Made with a mixture of acetic acid (0.5), alcohol (5), and water (4.5).

Average dose: 0.15 mil or 2½ minims.

FLUIDEXTRACTUM LUPULINI, N. F. IV. From U. S. P. VIII.

Fldext. Lupulin.

Fluidextract of Lupulin. Made with alcohol.

Average dose: 0.5 mil or 8 minims.

FLUIDEXTRACTUM MALTI, N. F. III. Deleted.

FLUIDEXTRACTUM MATICO, N. F. IV. From U. S. P. VIII.

Fldext. Matic.

Fluidextract of Matico. Made with a mixture of alcohol (3) and water (1).

Average dose: 4 mils or 1 fluidrachm.

FLUIDEXTRACTUM MENISPERMI, N. F. III. Deleted.

FLUIDEXTRACTUM MENYANTHIS, N. F. III. Deleted.

FLUIDEXTRACTUM MEZEREI, N. F. IV. From U. S. P. VIII.

Fldext. Mezer.

Fluidextract of Mezereum. Made with a mixture of alcohol (4) and water (1).

Preparations: N. F.—Linimentum Sinapis Compositum.

FLUIDEXTRACTUM NUCIS VOMICÆ, U. S. P. IX. Fldext. Nuc. Vom.

Fluidextract of Nux Vomica, Fluid Extract of Nux Vomica. Yields from 2.37 to 2.63 per cent of the alkaloids of nux vomica. Made with a mixture of alcohol (3) and water (1). Method of assay.

Average dose: 0.05 mil or 1 minim.

FLUIDEXTRACTUM PARACOTO, N. F. IV. Fldext. Paracot.

Fluidextract of Paracoto (to replace Fluidextractum Coto, N. F. III). Made with a mixture of alcohol (9) and water (1).

Average dose: 0.3 mil or 5 minims.

FLUIDEXTRACTUM PAREIRÆ, N. F. IV. From U. S. P. VIII.

Fldext. Pareir.

Fluidextract of Pareira. Made with diluted alcohol.

Average dose: 2 mils or 30 minims.

FLUIDEXTRACTUM PETROSELINI RADICIS, N. F. IV.

Fldext. Petrosel. Rad.

Fluidextract of Parsley Root. Made with a mixture of alcohol (2) and water (1).

Average dose: 2 mils or 30 minims.

FLUIDEXTRACTUM PHYTOLACCÆ, N. F. IV. From U. S. P. VIII.

Fldext. Phytolac.

Fluidextract of Phytolacca. Prepared with diluted alcohol.

Average dose: Emetic 1 mil or 15 minims.

Alterative, 0.1 mil or 1½ minims.

FLUIDEXTRACTUM PILOCARPI, U. S. P.

Fldext. Pilocarp.

Fluidextract of Pilocarpus, Fluid Extract of Pilocarpus, Fluidextract of Jaborandi. Yields from 0.55 to 0.65 w/v per cent of the alkaloids of pilocarpus. Made with a mixture of alcohol (2) and water (1).

Average dose: 2 mils or 30 minims.

FLUIDEXTRACTUM PODOPHYLLI, U. S. P. IX. Fldext. Podophyll.

Fluidextract of Podophyllum, Fluid Extract of Podophyllum. Made with alcohol.

Average dose: 0.5 mil or 8 minims.

FLUIDEXTRACTUM PRUNI VIRGINIANÆ, N. F. IV. From U. S. P. VIII.

Fldext. Prun. Virg.

Fluidextract of Wild Cherry. Extracted with a mixture of glycerin (20), water (40). Percolation completed with a mixture of alcohol (2.5) and water (1.5).

Average dose: 2 mils or 30 minims.

FLUIDEXTRACTUM QUASSIÆ, N. F. IV. From U. S. P. VIII.

Fldext. Quass.

Fluidextract of Quassia. Made with a mixture of alcohol (1) and water (2).

Average dose: 0.5 mils or 8 minims.

FLUIDEXTRACTUM QUERCUS, N. F. IV. From U. S. P. VIII.

Fldext. Querc.

Fluidextract of Quercus. Made with a mixture of glycerin (1), alcohol (5), and water (4).

Average dose: 1 mil or 15 minims.

FLUIDEXTRACTUM QUILLAJÆ, U. S. P. VIII. Deleted.

FLUIDEXTRACTUM RHAMNI CATHARTICÆ, N. F. IV.

Fldext. Rham. Cathart.

Fluidextract of Rhamnus Cathartica, Fluidextract of Buckthorn Berries. Made with diluted alcohol.

Average dose: 1 mil or 15 minims.

FLUIDEXTRACTUM RHAMNUS PURSHIANÆ, U. S. P. VIII. See Fluidextractum Cascaræ Sagradæ, U. S. P. IX.

FLUIDEXTRACTUM RHAMNUS PURSHIANÆ ALKALINUM, N. F. III. Deleted.

FLUIDEXTRACTUM RHAMNUS PURSHIANÆ AROMATICUM, U. S. P. VIII.

See Fluidextractum Cascaræ Sagradæ Aromaticum, U. S. P. IX.

FLUIDEXTRACTUM RHEI, U. S. P. IX.

Fldext. Rhei.

Fluidextract of Rhubarb, Fluid Extract of Rhubarb. Official in European pharmacopœias as Extractum Rhei Fluidum (E). Made with a mixture of alcohol (4) and water (1).

Average dose: 1 mil or 15 minims.

Preparations: N. F.—Elixir Catharticum Compositum, Mistura Rhei Alkalina, Mistura Rhei Composita, Syrupus Sennæ Compositus, Vinum Rhei Compositum.

FLUIDEXTRACTUM RHOIS GLABRÆ, N. F. IV. From U. S. P. VIII.

Fldext. Rhois Glab.

Fluidextract of Rhus Glabra. Made with a mixture of glycerin (1), alcohol (5), and water (4).

Average dose: 1 mil or 15 minims.

FLUIDEXTRACTUM ROSÆ, U. S. P. IX.

Fldext. Rosæ.

Fluidextract of Rose, Fluid Extract of Rose. Made with a mixture of glycerin (1), alcohol (5), and water (4).

Average dose: 2 mils or 30 minims.

Preparations: U. S. P.—Mel Rosæ.

N. F.—Syrupus Rosæ.

FLUIDEXTRACTUM RUBI, N. F. IV. From U. S. P. VIII.

Fldext. Rubi.

Fluidextract of Rubus. Made with diluted alcohol.

Average dose: 1 mil or 15 minims.

Preparation: N. F.—Syrupus Rubi.

FLUIDEXTRACTUM RUMICIS, N. F. IV. Fldext. Rumic.

Fluidextract of Rumex. Made with diluted alcohol.

Average dose: 4 mils or 1 fluidrachm.

FLUIDEXTRACTUM SABAL, U. S. P. IX. New. Fldext. Sabal.

Fluidextract of Sabal, Fluid Extract of Sabal, Fluidextract of Saw Palmetto. Made with a mixture of alcohol (4) and water (1).

Average dose: 1 mil or 15 minims.

FLUIDEXTRACTUM SABINÆ, U. S. P. VIII. Deleted.

FLUIDEXTRACTUM SANGUINARIÆ, N. F. IV. From U. S. P. VIII.

Fldext. Sanguin.

Fluidextract of Sanguinaria. A hydro-alcoholic extract: Made with a mixture of water (25) and alcohol (75), citric acid (10).

Average dose: 0.1 mil or $\frac{1}{4}$ minim.

FLUIDEXTRACTUM SARSAPARILLÆ, U. S. P. IX. Fldext. Sarsap.

Fluidextract of Sarsaparilla, Fluid Extract of Sarsaparilla. Official in European pharmacopœias as Extractum Sarsaparillæ Fluidum (E). Made with diluted alcohol.

Average dose: 2 mils or 30 minims.

Preparation: U. S. P.—Syrupus Sarsaparillæ Compositus.

FLUIDEXTRACTUM SARSAPARILLÆ COMPOSITUM, U. S. P. IX.

Fldext. Sarsap. Co.

Compound Fluidextract of Sarsaparilla, Compound Fluid Extract of Sarsaparilla. A mixture of sarsaparilla (15), glycyrrhiza (12), sassafras (10), mezereum (3), extracted with a mixture of glycerin (1), alcohol (5), and water (4).

Average dose: 2 mils or 30 minims.

FLUIDEXTRACTUM SCILLÆ, U. S. P. IX. Fldext. Scill.

Fluidextract of Squill, Fluid Extract of Squill. Made with a mixture of alcohol (2) and water (1). Biological method of assay.

Average dose: 0.1 mil or $1\frac{1}{4}$ minims.

Preparations: U. S. P.—Syrupus Scillæ Compositus.

N. F.—Mistura Pectoralis, Stokes.

FLUIDEXTRACTUM SCOPARIÆ, N. F. IV. Fldext. Scopar.

Fluidextract of Scoparius. Made with diluted alcohol.

Average dose: 1 mil or 15 minims.

FLUIDEXTRACTUM SCOPOLÆ, U. S. P. VIII. Deleted.

FLUIDEXTRACTUM SCUTELLARIÆ, N. F. IV. From U. S. P. VIII.

Fldext. Scutellar.

Fluidextract of Scutellaria. Made with diluted alcohol.

Average dose: 1 mil or 15 minims.

FLUIDEXTRACTUM SENECTIONIS, N. F. IV. New. Fldext. Senecion.

Fluidextract of Senecio. Made with a mixture of alcohol (2) and water (1).

Average dose: 4 mils or 1 fluidrachm.

FLUIDEXTRACTUM SENEGÆ, U. S. P. IX.

Fldext. Seneg.

Fluidextract of Senega, Fluid Extract of Senega. Made with a mixture of alcohol (2) and water (1).

Average dose: 1 mil or 15 minims.

Preparations: U. S. P.—Syrupus Scillæ Compositus, Syrupus Senegæ.

N. F. Elixir Catharticum Compositum, Elixir Rhamni Purshianæ Compositum, Mistura Pectoralis, Stokes.

FLUIDEXTRACTUM SENNÆ, U. S. P. IX.

Fldext. Senn.

Fluidextract of Senna, Fluid Extract of Senna. Made with a mixture of alcohol (1) and water (2).

Average dose: 2 mils or 30 minims.

Preparations: U. S. P.—Syrupus Sarsaparillæ Compositus, Syrupus Sennæ.

N. F.—Elixir Cascaræ Sagradæ Compositum, Elixir Catharticum Compositum, Syrupus Ficorum Compositus, Syrupus Sennæ Aromaticus, Syrupus Sennæ Compositus.

FLUIDEXTRACTUM SERPENTARIÆ, N. F. IV. From U. S. P. VIII.

Fldext. Serpentar

Fluidextract of Serpentaria. Made with a mixture of alcohol (4) and water (1).

Average dose: 1 mil or 15 minims.

FLUIDEXTRACTUM SOLANI, N. F. IV. New.

Fldext. Solan.

Fluidextract of Solanum, Fluid extract of Horse Nettle Berries. Made with a mixture of alcohol (2) and water (1).

Average dose: 4 mils or 1 fluidrachm.

FLUIDEXTRACTUM SPIGELLÆ, U. S. P. IX.

Fldext. Spigel.

Fluidextract of Spigelia, Fluidextract of Pink Root, Fluid Extract of Spigelia. Made with diluted alcohol.

Average dose: 5 mils or 1 fluidrachm.

FLUIDEXTRACTUM STAPHISAGRIÆ, U. S. P. IX

Fldext. Staphisag.

Fluidextract of Staphisagria, Fluid Extract of Staphisagria, Fluidextract of Stavesacre. Made with alcohol.

FLUIDEXTRACTUM STERCULÆ, N. F. III. See Fluidextractum Kolæ, N. F. IV.

FLUIDEXTRACTUM STILLINGIÆ, U. S. P. IX.

Fldext. Stilling.

Fluidextract of Stillingia, Fluid Extract of Stillingia. Made with diluted alcohol.

Average dose: 2 mils or 30 minims.

Preparation: N. F.—Elixir Corydalis Compositum.

FLUIDEXTRACTUM STILLINGIÆ COMPOSITUM, N. F.

Fldext. Stilling. Co.

Compound Fluidextract of Stillingia. A mixture of stillingia (25), corydalis (25), blue flag (12.5), sambucus (12.5), chimaphila (12.5), coriander (6.3), and prickly ash berries (6.2) extracted with a mixture of glycerin (25), alcohol (50), and water (25), followed by diluted alcohol (to make 100).

Average dose: 2 mils or 30 minims.

FLUIDEXTRACTUM STRAMONII, N. F. IV. From U. S. P. VIII.

Fldext. Stramon.

Fluidextract of Stramonium. Made with a mixture of alcohol (2) and water (1). Yields from 0.22 to 0.28 w/v per cent of the alkaloids of Stramonium. Method of assay.

Average dose: 0.05 mil or 1 minim.

FLUIDEXTRACTUM STRAMONII SEMINIS, N. F. III.

Deleted.

FLUIDEXTRACTUM SUMBUL, U. S. P. IX.

Fldext. Sumbul.

Fluidextract of Sumbul, Fluidextract of Musk Root, Fluid Extract of Sumbul. Made with a mixture of alcohol (4) and water (1).

Average dose: 2 mils or 30 minims.

FLUIDEXTRACTUM TARAXACI, U. S. P. IX.

Fldext. Tarax.

Fluidextract of Taraxacum, Fluidextract of Dandelion, Fluid Extract of Taraxacum. Made with a mixture of glycerin (1), alcohol (5), and water (4).

Average dose: 10 mils or 2½ fluidrachms.

Preparations: N. F.—Elixir Gentianæ Glycerinatum, Elixir Taraxaci Compositum.

FLUIDEXTRACTUM THUJÆ, N. F. IV. New.

Fldext. Thuj.

Fluidextract of Thuja. Made with alcohol.

Average dose: 2 mils or 30 minims.

FLUIDEXTRACTUM THYMI, N. F. IV. New.

Fldext. Thym.

Fluidextract of Thyme. Made with a mixture of glycerin (10), alcohol (25), and water (65).

Average dose: 4 mils or 1 fluidrachm.

EXTRACTUM TRIFOLII, N. F. IV.

Fldext. Trifol.

Fluidextract of Trifolium. Made with diluted alcohol.

Average dose: 4 mils or 1 fluidrachm.

FLUIDEXTRACTUM TRILLII, N. F. IV.

Fldext. Trill.

Fluidextract Trillium. Made with a mixture of alcohol (3) and water (1).

Average dose: 2 mils or 30 minims.

Preparation: N. F.—Elixir Viburni Opli Compositum.

FLUIDEXTRACTUM TRITICI, U. S. P. IX. Fldext. Tritic.

Fluidextract of Triticum, Fluidextract of Couch Grass, Fluid Extract of Triticum. The water-soluble constituents of triticum preserved with alcohol (20 v. per cent).

Average dose: 10 mils or 2½ fluidrachms.

FLUIDEXTRACTUM TURNERÆ, N. F. III. See Fluidextractum Damianæ, N. F. IV.

FLUIDEXTRACTUM URTICÆ, N. F. III. Deleted.

FLUIDEXTRACTUM UVÆ URSI, U. S. P. IX. Fldext. Uvæ Ursi.

Fluidextract of Uva Ursi, Fluid Extract of Uva Ursi. Made with a mixture of glycerin (1), alcohol (3), and water (5).

Average dose: 2 mils or 30 minims.

FLUIDEXTRACTUM VALERIANÆ, N. F. IV. From U. S. P. VIII.

Fldext. Valer.

Fluidextract of Valerian. Made with a mixture of alcohol (4) and water (1).

Average dose: 2 mils or 30 minims.

FLUIDEXTRACTUM VERATRI, U. S. P. VIII. See Fluidextractum Veratri Viridis, U. S. P. IX.

FLUIDEXTRACTUM VERATRI VIRIDIS, U. S. P. IX. Fldext. Verat. Vir.

Fluidextract of Veratrum Viride, Fluidextract of Green Hellebore, Fluid Extract of Veratrum Viride. Made with alcohol.

Average dose: 0.1 mil or 1½ minims.

FLUIDEXTRACTUM VERBASCI, FOLLÆ N. F. IV. Fldext. Verbasc. Fol.

Fluidextract of Mullein leaves, Fluidextract of Verbascum. Made with diluted alcohol.

Average dose: 4 mils or 1 fluidrachm.

FLUIDEXTRACTUM VERBENÆ, N. F. IV. Fldext. Verben.

Fluidextract of Verbena. Made with diluted alcohol.

Average dose: 1 mil or 15 minims.

FLUIDEXTRACTUM VIBURNI OPULI, N. F. IV. From U. S. P. VIII.

Fldext. Viburn. Opul.

Fluidextract of Viburnum Opulus, Fluidextract of Cramp Bark. The drug extracted with alcohol (2) and water (1).

Average dose: 2 mils or 30 minims.

FLUIDEXTRACTUM VIBURNI PRUNIFOLII, U. S. P. IX.

Fldext. Viburn. Prun.

Fluidextract of ~~Viburnum~~ Prunifolium, Fluidextract of Black Haw, Fluid Extract of ~~Viburnum~~ Prunifolium. Official in European

pharmacopœias as *Extractum Viburni Fluidum* (E). Made with a mixture of alcohol (2) and water (1).

Average dose: 2 mils or 30 minims.

Preparation: N. F.—*Elixir Viburni Prunifolii*.

FLUIDEXTRACTUM XANTHOXYLI, U. S. P. IX. Fldext. Xanthox.

Fluidextract of Xanthoxylum, Fluidextract of Prickly Ash, Fluid Extract of Xanthoxylum. Made with a mixture of alcohol (3) and water (1).

Average dose: 2 mils or 30 minims.

Preparation: N. F.—*Elixir Corydalis Compositum*.

FLUIDEXTRACTUM ZÆ, N. F. IV.

Fldext. Zea.

Fluidextractum Zea. Made with diluted alcohol.

Average dose: 4 mils or 1 fluidrachm.

FLUIDEXTRACTUM ZINGIBERIS, U. S. P.

Fldext. Zingib.

Fluidextract of Ginger, Fluid Extract of Ginger. Made with alcohol.

Average dose: 1 mil or 15 minims.

Preparation: U. S. P.—*Syrupus Zingiberis*.

FLUIDGLYCERATA, N. F. New.

Fluidglycerates. Concentrated liquid preparations of the same strength as fluidextracts. They contain approximately 50 per cent by volume of glycerin and no alcohol. General process for making.

FLUIDGLYCERATUM CASCARÆ SAGRADÆ, N. F. IV. New.

Fldglycer. Cascar. Sagr.

Fluidglycerate of Cascara Sagrada. Fluidglycerate of *Rhamnus Purshiana*. Made with a mixture of glycerin and water.

Average dose: 1 mil or 15 minims.

FLUIDGLYCERATUM CASCARÆ SAGRADÆ AROMATICUM, N. F. IV. New.

Fldglycer. Cascar. Sagr. Arom.

Aromatic Fluidglycerate of Cascara Sagrada, Aromatic Fluidglycerate of *Rhamnus Purshiana*, Cascara Sagrada (75), extracted with an alkaline (lime) mixture of glycerin and water. The concentrated extract is mixed with fluidglycerate of glycyrrhiza (25), aromatized with oil of fennel, oil of clove, and oil of cinnamon.

Average dose: 1 mil or 15 minims.

Preparation: N. F.—*Syrupus Ficorum Compositus*.

FLUIDGLYCERATUM GLYCYRRHIZÆ, N. F. IV. New.

Fldglycer. Glycyrrh.

Fluidglycerate of Glycyrrhiza, Fluidglycerate of Licorice. Made with a mixture of glycerin and water made alkaline by ammonia water.

Average dose: 2 mils or 30 minims.

FLUIDGLYCERATUM KRAMERLÆ N. F. IV. New.

Fldglycer. Kramer.

Fluidglycerate of Krameria. Made with a mixture of glycerin and water.

Average dose: 1 mil or 15 minims.

FLUIDGLYCERATUM RHEI, N. F. IV. New.

Fldglycer. Rhei.

Fluidglycerate of Rhubarb. Made with a mixture of glycerin and water.

Average dose: 1 mil or 15 minims.

FŒNICULUM, U. S. P. IX.

Fœnic.

Fennel, Fennel Seed. Official in European pharmacopœias as *Fructus Fœniculi* (E). The dried, ripe fruits of cultivated varieties of *Fœniculum vulgare* Miller without admixture of more than 4 per cent of foreign matter. Yields not more than 9 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparations: U. S. P.—*Infusum Sennæ Compositum*.

N. F.—*Pilulæ Antiperiodicæ*, *Pilulæ Antiperiodicæ sine Aloe*, *Species Laxativæ*, *Tinctura Antiperiodica*, *Tinctura Antiperiodica sine Aloe*.

FRANGULA, U. S. P. IX.

Frang.

Frangula, Buckthorn Bark. Official in European pharmacopœias as *Cortex Frangulæ* (E). The dried bark of *Rhamnus frangula* Linné. Qualitative test for emodin. Yields not more than 6 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparation: U. S. P.—*Fluidextractum Frangulæ*.

FRAXINUS, N. F. IV. Part II.

Fraxin.

White Ash Bark. The dried bark of *Fraxinus americana* Linné and probably of other species of *Fraxinus*, deprived of the corky layer. Yields not more than 10 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparation: N. F.—*Vinum Fraxini Americanæ*.

FUCUS, N. F. IV. Part II.

Fucus.

Fucus, Bladderwrack. The dried thallus of *Fucus vesiculosus* Linné. Yields not more than 20 per cent of ash.

Average dose: 0.65 or 10 grains.

Preparation: N. F.—*Fluidextractum Fuci*.

GALANGAL, N. F. IV. Part II.

Galang.

Galangal. The dried rhizome of *Alpina officinarum* Hance. Yields not more than 10 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparation: N. F.—*Tinctura Aromatica*.

GALEGA, N. F. IV. Part II.

Galeg.

Galega, European Goat's Rue. The dried flowering tops of *Galega officinalis* Linné. Yields not more than 12 per cent of ash.

Average dose: 4 gm. or 1 drachm.

Preparation: N. F.—Fluidextractum Galegæ.

GALLA, U. S. P. IX.

Gall.

Nutgall, Aleppo Galls, Smyrna Galls. Official in European pharmacopœias as Gallæ (E). Excrescences on the young twigs of *Quercus infectoria* Olivier and other allied species of *Quercus*, induced by the punctures on the leaf-buds and by the deposited ova of *Cynips tinctoria* Hartig. Not more than 5 per cent of Galls float in water.

Average dose: 0.5 gm. or 8 grains.

Preparations: U. S. P.—Unguentum Gallæ.

N. F.—Elixir Rubi Compositum, Tinctura Gallæ.

GAMBIR, U. S. P. IX.

Gambir, Pale Catechu. A dried extract prepared from decoctions of the leaves and twigs of *Ourouparia Gambir* Baillon. Yields not more than 9 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparations: U. S. P.—Tinctura Gambir Composita.

N. F.—Pulvis Gambir Compositus, Trochisci Gambir.

GARGARISMA GUAIACI COMPOSITA, N. F. IV. New.

Garg. Guaiac. Co.

Compound Gargle of Guaiac. A mixture of ammoniated tincture of guaiac (10), compound tincture of cinchona (10), clarified honey (20), potassium chlorate (4), oil of peppermint (0.2), and water (to make 100).

GELATINUM, U. S. P. IX.

Gelatin.

Gelatin. Official in European pharmacopœias as Gelatina Alba (E). The purified product obtained from animal tissues, as skin, ligaments, and bones, by treatment with boiling water. Tests for impurities. Gelatin capsules contain not more than 0.15 per cent of sulphur dioxide.

Preparations: U. S. P.—Gelatinum Glycerinatum.

N. F.—Glycero-gelatina.

GELATINUM CHONDRI, N. F. IV.

Gelatin. Chondr.

Chondrus Gelatin, Irish Moss Gelatin. Chondrus extracted with water, the extract strained and evaporated so that the product is available in the form of scales.

GELATINUM GLYCERINATUM, U. S. P. IX.

Gelatin. Glycerin.

Glycerinated Gelatin. A mixture of gelatin (50) and glycerin (50).

GELSEMIUM, U. S. P. IX.

Gelsem.

Gelsemium, Yellow Jasmine Root, Yellow Jessamine. Official in European pharmacopœias as *Rhizoma Gelsemii* (E). The dried rhizome and roots of *Gelsemium sempevirens* Aiton filius.

Average dose: 0.03 gm. or $\frac{1}{4}$ grain.

Preparations: U. S. P.—*Extractum Gelsemii*, *Fluidextractum Gelsemii*, *Tinctura Gelsemii*.

GENTIANA, U. S. P. IX.

Gent.

Gentian, Yellow Gentian Root. Official in European pharmacopœias as *Radix Gentianæ* (E). The dried rhizome and roots of *Gentiana lutea* Linné.

Average dose: 1 gm. or 15 grains.

Preparations: U. S. P.—*Extractum Gentianæ*, *Fluidextractum Gentianæ*, *Tinctura Gentianæ Composita*.

N. F.—*Infusum Gentianæ Compositum*, *Tinctura Amara*, *Tinctura Antiperiodica*, *Tinctura Antiperiodica sine Aloe*, *Tinctura Rhei et Gentianæ*, *Tinctura Zedoariæ Amara*.

GERANIUM, N. F. IV., Part II. From U. S. P. VIII.

Geran.

Geranium, Cranesbill. The dried rhizomes of *Geranium maculatum* Linné. Yields not more than 8 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparation: N. F.—*Fluidextractum Geranii*.

GLANDULÆ SUPRARENALÆ SICCÆ, U. S. P. VIII. See *Suprarenalum siccum*, U. S. P. IX.

GLANDULÆ THYROIDEÆ SICCÆ, U. S. P. VIII. See *Thyroideum siccum*, U. S. P. IX.

GLUCOSUM, U. S. P. IX. New.

Glucos.

Glucose, Syrupy Glucose, Liquid Glucose. A syrupy product obtained by the incomplete hydrolysis of starch, consisting chiefly of dextrose (d-glucose), $C_6H_{12}O_6$, and dextrins.

Preparations: U. S. P. *Extracta* (as a diluent).

N. F.—*Extractum Aconiti Foliorum*, *Extractum Cinchonæ*.

GLYCERINUM, U. S. P. IX.

Glycerin.

Glycerin, Glycerol. A liquid obtained by the hydrolysis of vegetable or animal fats or fixed oils, purified by distillation and containing not less than 95 per cent of the trihydric alcohol $C_3H_5(OH)_3$. Specific gravity not below 1.249 at 25°. Glycerin is colorless when viewed transversely in a tube of colorless glass not more than 30 mm. in diameter held in a vertical position. A modified residue test and tests for fatty acids and esters.

Average dose: 4 mils or 1 fluidrachm.

Preparations: U. S. P.—*Gelatinum Glycerinatum*, *Suppositoria Glycerini*. Used as a solvent in making glycerita and other preparations.

N. F.—*Cataplasma Kaolini*. Used in making: *Fluidglycerata*, *glycerogelatina* and other preparations.

GLYCERITUM ACIDI TANNICI, U. S. P. IX. Glycer. Acid. Tann.

Glycerite of Tannic Acid, Glycerite of Tannin. A solution of tannic acid (20) in glycerin (to make 100). Method of making modified.

Average dose: 2 mils or 30 minims.

GLYCERITUM AMYLI, U. S. P. IX. Glycer. Amyl.

Glycerite of Starch. Official in European pharmacopœias as *Unguentum Glycerini* (E). Made by heating starch (10), water (10), and glycerin (to make 100).

GLYCERITUM BISMUTHI, N. F. IV. Glycer. Bism.

Glycerite of Bismuth. Contains not less than 12.8 w/v per cent of bismuth oxide. Method of making and a method of assay.

Preparations: N. F.—*Elixir Bismuthi*, *Elixir Cinchonæ Alkaloidorum*, *Ferri et Bismuthi*, *Elixir Pepsini et Bismuthi*, *Liquor Bismuthi*.

GLYCERITUM BOROGLYCERINI, U. S. P. IX. Glycer. Boroglyc.

Glycerite of Boroglycerin. A solution of boric acid (31) in glycerin (to make 100).

Average dose:

Preparation: N. F.—*Suppositoria Boroglycerini*.

GLYCERITUM FERRI, QUININÆ ET STRYCHNINÆ PHOSPHATUM, U. S. P. VIII. Deleted.

GLYCERITUM GUAIACI, N. F. IV. Glycer. Guaiac.

Glycerite of Guaiac. Guaiac (8.5) saponified by a dilution of solution of potassium hydroxide (6.5) and preserved by the addition of glycerin (60) with water (to make 100).

Average dose: 2 mils or 30 minims.

GLYCERITUM HYDRASTIS, U. S. P. IX. Glycer. Hydrast.

Glycerite of Hydrastis, Glycerite of Golden Seal. Yields from 1.12 to 1.37 w/v per cent of the ether-soluble alkaloids of hydrastis. Hydrastis extracted with a mixture of alcohol and water and the resulting extract dissolved in a mixture of water and glycerin. Method of assay.

Average dose: 2 mils or 30 minims.

GLYCERITUM PEPSINI, N. F. IV. Glycer. Pepsin.

Glycerite of Pepsin. A solution of pepsin (8.5) in a mixture of hydrochloric acid (1), glycerin (50) and distilled water (to make 100).

Average dose: 3 mils or 45 minims.

Preparations: N. F.—Elixir Cinchonæ Alkaloidorum Ferri et Pepsini, Elixir Pepsini, Liquor Pepsini, Succus Citri et Pepsinum, Vinum Pepsini.

GLYCERITUM PHENOLIS, U. S. P. IX. Glycer. Phenol.

Glycerite of Phenol. Glycerite of Carbolic Acid. A mixture of phenol (20) and glycerin (to make 100).

Average dose: 0.3 mil or 5 minims.

GLYCERITUM PICIS LIQUIDÆ, N. F. IV. Glycer. Pic. Liq.

Glycerite of Tar. Tar (6.3), washed with water, then triturated with alcohol (12.5), magnesium carbonate (12.5), glycerin (25), and water (62.5) followed by water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

GLYCERITUM TRAGACANTHÆ, N. F. IV. Glycer. Trag.

Glycerite of Tragacanth. A mixture of tragacanth (12.5), glycerin (77.5), and water (to make 100).

GLYCERITUM VITELLI, N. F. IV. Glycer. Vitell.

Glycerite of Yolk of Egg, Glyconin. A mixture of fresh yolk of egg (45) and glycerin (to make 100).

Preparation: N. F.—Emulsum Olei Morrhuæ cum Vitello.

GLYCEROGELATINA, N. F. IV.

Glycerogelatina. Soft, masses, composed of a medicament with a mixture of glycerin, gelatin, and water melting at the body temperature.

GLYCEROGELATINUM ACIDI SALICYLICI, N. F. IV.

Glycerogelat. Acid. Salicyl.

Salicylic Acid Glycerogelatin. A mixture of glycerinated gelatin (20), salicylic acid (10), glycerin (35), and distilled water (to make 100).

GLYCEROGELATINUM IODOFORMI, N. F. IV. Glycerogelat. Iodof.

Iodoform Glycerogelatin. A mixture of glycerinated gelatin (10), iodoform (10), glycerin (15) and distilled water (to make 100).

GLYCEROGELATINUM ZINCI DURUM, N. F. IV.

Glycerogelat. Zinc. Dur.

Firm Zinc Glycerogelatin. A mixture of glycerinated gelatin (30), zinc oxide (10), glycerin (25), and distilled water (to make 100).

GLYCEROGELATINUM ZINCI MOLLE, N. F. IV.

Glycerogelat. Zinc. Mol.

Soft Zinc Glycerogelatin. A mixture of glycerinated gelatin (20), zinc oxide (10), glycerin (35), and distilled water (to make 100).

GLYCYRRHIZA, U. S. P. IX.

Glycyrrh.

Glycyrrhiza, Liquorice, Licorice Root. Official in European pharmacopœias as Radix Liquiritiæ (E), Radix Glycyrrhizæ (S). The

dried rhizome and roots of *Glycyrrhiza glabra typica* Regel et Herder, known in commerce as Spanish licorice or of *Glycyrrhiza glabra glandulifera* Regel et Herder, known in commerce as Russian Licorice. Glycyrrhiza yields not more than 7 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparations: U. S. P.—Extractum Glycyrrhizæ Purum (which see), Fluidextractum Cascara Sagradæ Aromaticum (which see), Fluidextractum Glycyrrhizæ (which see), Pulvis Glycyrrhizæ Compositus, Tinctura Aloes.

N. F.—Decoctum Sarsaparillæ Compositum, Fluidglyceratum Glycyrrhizæ (which see), Pilulæ Laxativæ Compositæ, Species Pectorales Tinctura Aloes et Myrrhæ, Tinctura Rhei Dulcis.

GLYCYRRHIZINUM AMMONIATUM, U. S. P. IX. Glycyrrh. Ammon.

Ammoniated Glycyrrhizin. Occurs in dark brown or brownish red scales, without odor and having a very sweet taste. Leaves not more than 0.5 per cent of ash.

Average dose: 0.25 gm. or 4 grains.

GOSSYPII CORTEX, N. F. IV. Part II. From U. S. P. VIII.

Gossyp. Cort.

Cotton Root Bark. The recently gathered or dried bark of the root of one or more cultivated varieties of *Gossypium herbaceum* Linné, *Gossypium barbadense* Linné or *Gossypium arboreum* Linné, without admixture of more than 5 per cent of wood and other foreign matter. Yields not more than 7 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparation: N. F.—Fluidextractum Gossypii Corticis.

GOSSYPIUM STYPTICUM, N. F. IV.

Gossyp. Stypt.

Styptic Cotton. Purified cotton (10), saturated with a mixture of solution of ferric chloride (8), glycerin (1.6), and water (22.5), expressed and dried.

GOSSYPIUM PURIFICATUM, U. S. P. IX.

Gossyp. Purif.

Purified Cotton, Absorbent Cotton. The hairs of the seed from one or more of the cultivated varieties of *Gossypium herbaceum* Linné, freed from adhering impurities and linters and deprived of fatty matter. Leaves not more than 0.2 per cent of ash.

Preparation: N. F.—Gossypium Stypticum.

GRANATUM, U. S. P. IX.

Granat.

Pomegranate, Pomegranate Bark. Official in European pharmacopœias as Cortex Granati (E). The dried bark of the stems and roots of *Punica Granatum* Linné, without the presence or admixture of more than 2 per cent of wood and other foreign matter. Yields not more than 16 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparation: U. S. P.—Fluidextractum Granati.

GRINDELIA, U. S. P. IX.

Grindel.

Grindelia. The dried leaves and flowering tops of *Grindelia camporum* Greene, *Grindelia cuneifolia* Nuttall, or *Grindelia squarrosa* Dunal without more than 10 per cent of stems and other foreign matter.

Average dose: 2 gm. or 30 grains.

Preparation: U. S. P.—Fluidextractum Grindeliæ.

GUAIACI LIGNUM, N. F. IV. Part II.

Guaiac. Lig.

Guaiac wood. Lignum Vitæ. The heart-wood of *Guaiacum officinale* Linné or of *Guaiacum sanctum* Linné. Yields not more than 3 per cent of ash.

Average dose: 4 gm. or 1 drachm.

Preparation: N. F.—Decoctum Sarsaparillæ Compositum.

GUAIACOL, U. S. P. IX.

Guaiacol.

Guaiacol. Official in European pharmacopœias as Guajacolum (E). The monomethyl ether ($C_7H_5O_2$) of orthodihydroxy-benzene, obtained from wood-tar creosote or prepared synthetically. Specific gravity from 1.112 to 1.114 at 25°. Solid guaiacol melts at about 28°. Not less than 85 per cent distils between 200° and 210°. Tests for identity and purity.

Average dose: 0.5 mil or 8 minims.

Preparation: N. F.—Petroxolinum Guaiacolis.

GUAIACOLIS CARBONAS, U. S. P. IX.

Guaiacol. Carb.

Guaiacol Carbonate. Official in European pharmacopœias as Guajacolum Carbonicum (E). A guaiacol derivative $(C_7H_5O)_2CO_2$. Occurs as a crystalline powder. Melts between 83° and 87° and yields not more than 0.1 per cent of ash.

Average dose: 1 gm. or 15 grains.

GUAIACUM, U. S. P. IX.

Guaiac.

Guaiac, Guaiac Resin (Gum Resin). Official in European pharmacopœias as Resina Guajaci (E). The resin of the wood of *Guaiacum officinale* Linné or of *Guaiacum sanctum* Linné. Melts between 85° and 90° and yields not more than 4 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparations: U. S. P.—Tinctura Guaiaci, Tinctura Guaiaci Ammoniata.

N. F.—Glyceritum Guaiaci, Pilulæ Antimonii Compositæ, Tinctura Guaiaci Composita.

GUARANA, U. S. P. IX.

Guaran.

Guarana. A dried paste consisting chiefly of the crushed seeds of *Paullinia Cupana* Kunth. Yielding not less than 4 per cent of caffeine. Method of assay.

Average dose: 2 gm. or 30 grains.

Preparation: U. S. P.—Fluidextractum Guaranæ (which see).

GUTTA PERCHA, N. F. IV. Part II. Gutt. Percha.

Gutta Percha. The purified, coagulated, milky exudate of various trees, principally of the genus *Palaquium*. Yields not more than 5 per cent of ash.

Preparation: N. F.—Liquor Gutta-Perchæ.

HÆMATOXYLON, N. F. IV. Part II. From U. S. P. VIII. Hæmatox.

Hæmatoxylon, Logwood. The heart-wood of *Hæmatoxylon campechianum* Linné. When the surface has a greenish, metallic luster, reject the wood, as it has undergone fermentation. Yields not more than 3.5 per cent of ash.

Preparation: N. F.—Extractum Hæmatoxyli.

HAMAMELIDIS CORTEX, U. S. P. VIII. Deleted.

HAMAMELIDIS FOLIA, N. F. IV. Part II. From U. S. P. VIII.

Hamamel. Fol.

Hamamelis Leaves, Witch Hazel Leaves. The dried leaves of *Hamamelis virginiana* Linné collected in autumn before the flowering of the plants and without admixture of more than 10 per cent of stems and other foreign matter. Yields not more than 6 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparation: N. F.—Fluidextractum Hamamelidis Foliorum.

HEDEOMA, U. S. P. VIII. Deleted.

HELIANTHEMUM, N. F. IV. Part II. Helianth.

Helianthemum, Rock-Rose or Frost-Weed. The dried herb of *Helianthemum Canadense* Michaux.

Average dose: 4 gm. or 1 drachm.

Preparation: N. F.—Fluidextractum Helianthem. i.

HELONIAS, N. F. IV. Part II. Helon.

Helonias, False Unicorn. The dried rhizome and roots of *Chamaelirium luteum* A. Gray. Yields not more than 5 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparation: N. F.—Fluidextractum Helionatis.

HEXAMETHYLENAMINA, U. S. P. IX. Hexam.

Hexamethylenamine, Hexamethylene-tetramine. Also sold under the following trade names: Urotropin, Aminoform, Ammonioformaldehyde, Formalol, Ammonaldehyde, Cystamin, Cystogen, Formin, Formamine, Metramine, Urisol, Uritone, Xametrin. Official in the British Pharmacopœia as Hexamina, Hexamine, and in European pharmacopœias generally as Hexamethylentetraminum. A condensation product of ammonia and formaldehyde, hexamethylene-tetramine, $(CH_2)_6N_4$. Sublimes at about 263° . Leaves not more than 0.5 per cent of ash. Tests for identity and purity.

Average dose: 0.25 gm. or 4 grains.

HOMATROPINÆ HYDROBROMIDUM, U. S. P. IX.

Homatrop. Hydrobr.

Homatropine Hydrobromide, Homatropine Bromide. Official in European pharmacopœias as Homatropinum Hydrobromicum (E). The hydrobromide ($C_{16}H_{21}NO_3 \cdot HBr$) of homatropine, an alkaloid obtained by the condensation of tropine and maledic acid.

Melts at about 212° with partial decomposition. Tests for identity and purity.

Average dose: 0.0005 gm. or $\frac{1}{120}$ grain.

HUMULUS, U. S. P. IX.

Humul.

Hops. The carefully dried strobiles of *Humulus Lupulus* Linné bearing glandular trichomes and without the presence or admixture of more than 2 per cent of stems, leaves, and other foreign matter. Ash not exceeding 8 per cent.

Average dose: 2 gm. or 30 grains.

Preparations: N. F.—Fluidextractum Humuli, Tinctura Humuli.

HYDRANGÆA, N. F. IV. Part II.

Hydrang.

Hydrangea, Seven-Barks. The dried rhizomes and roots of *Hydrangea arborescens* Linné. Yields not more than 3 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparation: N. F.—Fluidextractum Hydrangææ.

HYDRARGYRI CHLORIDUM CORROSIVUM, U. S. P. IX.

Hydrarg. Chlor. Corr.

Corrosive Mercuric Chloride, Bichloride of Mercury, Corrosive Sublimate, Mercuric Chloride, Perchloride of Mercury. Official in European pharmacopœias as Hydrargyrum Bichloratum (E), Chloratum Hydrargyricum Corrosivum (S). Contains when dried not less than 99.5 per cent of $HgCl_2$. Leaves not more than 0.5 per cent of residue on dissolving in ether or alcohol. Method of assay with an alternative electrolytic method.

Average dose: 0.003 gm. or $\frac{1}{40}$ grain.

Preparations: U. S. P.—Toxibellæ Hydrargyri Chloridi Corrosivi.

N. F.—Mulla Hydrargyri chloridi corrosivi. Used in making Lotio Flava.

HYDRARGYRI CHLORIDUM MITE, U. S. P. IX.

Hydrarg. Chlor. Mit.

Mild Mercurous Chloride, Mercurous Chloride, Calomel, Porotchloride of Mercury, Subchloride of Mercury. Official in European pharmacopœias as Hydrargyrum Chloratum (E), Calomel (S). Contains when dried not less than 99.6 per cent of $HgCl$. On heating it is volatilized without fusion or the evolution of brown vapors. Leaves not more than 0.1 per cent of residue. Method of assay, and an alternative electrolytic method.

Average dose: Laxative 0.15 gm. or $2\frac{1}{2}$ grains; alterative 0.015 gm. or $\frac{1}{4}$ grain.

Preparations: U. S. P.—*Pilulæ Catharticæ Compositæ*.

N. F.—*Pilulæ Antimonii Compositæ*, *Pulvis Hydrargyri Chloridi Mitis et Jalapæ*, *Trochisci Santonini Compositi*. Used in making *Lotio Nigra*.

HYDRARGYRI IODIDUM FLAVUM, U. S. P. IX. Hydrarg. Iod. Flav.

Yellow Mercurous Iodide, Mercurous Iodide, Protoiodide of Mercury. Official in European pharmacopœias as *Hydrargyrum Iodatatum Flavum* (E). Contains when dried not less than 99 per cent of HgI . Tests for identity and purity and a method of assay with an alternative electrolytic method.

Average dose: 0.01 gm. or $\frac{1}{4}$ grain.

HYDRARGYRI IODIDUM RUBRUM, U. S. P. IX. Hydrarg. Iod. Rub.

Red Mercuric Iodide, Biniiodide of Mercury, Mercuric Iodide, Red Iodide of Mercury. Official in European pharmacopœias as *Hydrargyrum Bijodatatum* (E). Contains when dried not less than 99 per cent of HgI_2 . Tests for identity and purity and a method of assay with an alternative electrolytic method.

Average dose: 0.003 gm. or $\frac{1}{80}$ grain.

Preparations: U. S. P.—*Liquor Arseni et Hydrargyri Iodidi*.

N. F.—*Liquor Hydrargyri et Potassii Iodidi*.

HYDRARGYRI OXIDUM FLAVUM, U. S. P. IX. Hydrarg. Oxid. Flav.

Yellow Mercuric Oxide. Official in European pharmacopœias as *Hydrargyrum Oxydatatum Flavum* (E), *Oxydum Hydrargyricum Flavum* (S). Contains when dried not less than 99.5 per cent of HgO . Tests for identity and purity and a method of assay with an alternative electrolytic method.

Preparations: U. S. P.—*Unguentum Hydrargyri Oxidi Flavi*. Used in making *Oleatum Hydrargyri*.

HYDRARGYRI OXIDUM RUBRUM, U. S. P. IX. Hydrarg. Oxid. Rub.

Red Mercuric Oxide, Red Precipitate. Official in European pharmacopœias as *Hydrargyrum Oxydatatum Rubrum* (E), *Oxydum Hydrargyricum* (S). Contains when dried not less than 99.5 per cent of HgO . Tests for identity and purity and a method of assay with an alternative electrolytic method.

Preparations: N. F.—*Unguentum Hydrargyri Oxidi Rubri*. Used in making *Liquor Hydrargyri Nitratis*.

HYDRARGYRI SALICYLAS, U. S. P. IX. New. Hydrarg. Salicyl.

Mercuric Salicylate, Mercuric subsalicylate. Contains from 54 to 59.5 per cent of Hg. Tests for identity and purity and a method of assay with an alternative electrolytic method.

Average dose: 0.004 gm. or $\frac{1}{15}$ grain.

HYDRARGYRI SUBSULPHAS FLAVUS, N. F. III.

Deleted.

HYDRARGYRUM, U. S. P. IX.

Hydrarg.

Mercury, Quicksilver. Contains not less than 99.5 per cent of Hg. Tests for identity and purity and a method of assay with an alternative electrolytic method.

Preparations: U. S. P.—Hydrargyrum cum Creta, Massa Hydrargyri, Unguentum Hydrargyri (which see). Used in making: Unguentum Hydrargyri Nitratis.

N. F.—Petroxolinum Hydrargyri.

HYDRARGYRUM AMMONIATUM, U. S. P. IX.

Hydrarg. Ammon.

Ammoniated Mercury, White Precipitate. Official in European pharmacopœias as Hydrargyrum Præcipitatum Album (E), Chloretum Amido-hydrargyricum (S). Contains not less than 78 per cent nor more than 80 per cent of Hg. Tests for identity and purity and a method of assay with an alternative electrolytic method.

Preparation: U. S. P.—Unguentum Hydrargyri Ammoniatum.

HYDRARGYRUM CUM CRETA, U. S. P. IX.

Hydrarg. c. Cret.

Mercury with Chalk, Gray Powder. Contains from 37 to 39 per cent of Hg. Formula for making. Tests for identity and purity and a method of assay with an alternative electrolytic method.

Average dose: 0.25 gm. or 4 grains.

HYDRASTINA, U. S. P. IX.

Hydrastin.

Hydrastine. An alkaloid ($C_{21}H_{21}NO_6$) obtained from hydrastis or prepared synthetically. Melts at about 131° and leaves no weighable ash. Tests for identity and purity.

Average dose: 0.01 gm. or $\frac{1}{4}$ grain.

HYDRASTINÆ HYDROCHLORIDUM, U. S. P. IX. New.

Hydrastin. Hydrochl.

Hydrastine Hydrochloride, Hydrastine Chloride. The hydrochloride ($C_{21}H_{21}NO_6.HCl$) of the alkaloid hydrastine. Tests for identity and purity.

Average dose: 0.01 gm. or $\frac{1}{4}$ grain.

Preparation: N. F.—Liquor Hydrastinæ Compositus.

HYDRASTININÆ HYDROCHLORIDUM, U. S. P. IX.

Hydrastinin. Hydrochl.

Hydrastinine Hydrochloride, Hydrastinine Chloride. Official in European pharmacopœias as Hydrastininum Hydrochloridum (E), Chloretum Hydrastinicum (S). The hydrochloride ($C_{11}H_{11}NO_2.HCl$) of hydrastinine, an alkaloid obtained by the oxidation of hydrastine. Melts at about 210° with partial decomposition. Tests for identity and purity.

Average dose: 0.03 gm. or $\frac{1}{4}$ grain.

HYDRASTIS, U. S. P. IX.

Hydrast.

Hydrastis, Golden Seal. Official in European pharmacopœias as *Rhizoma Hydrastis* (E). The dried rhizome and roots of *Hydrastis canadensis* Linné without admixture of more than 2 per cent of the stems, leaves, and other foreign matter and yielding not less than 2.5 per cent of the ether-soluble alkaloids of hydrastis. Method of assay.

Average dose: 2 gm. or 30 grains.

Preparations: U. S. P.—Extractum Hydrastis, Fluidextractum Hydrastis (which see), Glyceritum Hydrastis, Tinctura Hydrastis.

HYOSCINÆ HYDROBROMIDUM, U. S. P. VIII. See Scopolaminæ Hydrobromidum, U. S. P. IX.

HYOSCYAMINÆ HYDROBROMIDUM, U. S. P. IX.

Hyoscyamin. Hydrobr.

Hyoscyamine Hydrobromide, Hyoscyamine Bromide. The hydrobromide ($C_{17}H_{23}NO_3 \cdot HBr$) of hyoscyamine, an alkaloid obtained from *hyoscyamus* and other plants of the *Solanaceæ*. Melts at about 152° and leaves no weighable amount of ash.

Average dose: 0.0003 gm. or $\frac{1}{2000}$ grain.

HYOSCYAMINÆ SULPHAS, U. S. P. IX. Deleted.

HYOSCYAMUS, U. S. P. IX.

Hyosc.

Hyoscyamus, Henbane. Included in the International Protocol as *Folium Hyoscyami* (P. I.). The dried leaves and flowering or fruiting tops of *Hyoscyamus niger* Linné, yielding not less than 0.065 per cent of the alkaloids of Hyoscyamus. Leaves not more than 30 per cent of ash. Method of assay.

Average dose: 0.25 gm. or 4 grains.

Preparations: U. S. P.—Extractum Hyoscyami, Fluid extractum Hyoscyami, Tinctura Hyoscyami.

N. F.—Oleum Hyoscyami Compositum.

HYPOPHYSIS SICCA, U. S. P. IX. New

Hypophysis Sic.

Desiccated Hypophysis, Desiccated Pituitary Body. The posterior lobe obtained from the pituitary body of cattle, cleaned, dried, and powdered.

Average dose: 0.03 gm. or $\frac{1}{2}$ grain.

Preparation: U. S. P.—Liquor Hypophysis (from fresh gland).

IGNATIA, N. F. IV. Part II.

Ignat.

Ignatia, Saint Ignatius Bean, Ignatia Amara. The dried seeds of *Strychnos ignatii* Bergius yielding not less than 2 per cent of the alkaloids of Ignatia. Method of assay.

Average dose: 0.06 gm. or 1 grain.

Preparations: N. F.—Extractum Ignatiæ, Tinctura Ignatiæ.

INFUSA, U. S. P. IX.

Infusions. A general formula. Infusions must be freshly made from the drugs.

INFUSUM BRAYERÆ, N. F. IV.

Inf. Brayer.

Infusion of Brayera. An infusion of brayera (6) with boiling water (100). Dispensed without straining.

Average dose: 250 mils or 8 fluidounces.

INFUSUM CINCHONÆ, N. F. IV.

Inf. Cinchon.

Infusion of Cinchona. An infusion of cinchona (6) with a mixture of aromatic sulphuric acid (1) and water (to make 100).

Average dose: 50 mils or 12 fluidrachms.

INFUSUM DIGITALIS, U. S. P. IX.

Inf. Digit.

Infusion of Digitalis, Digitalis (1.5) extracted with water (85) and flavored with cinnamon water (to make 100). Without the addition of a preservative. Must be freshly prepared from the leaves.

Average dose: 4 mils or 1 fluidrachm.

INFUSUM GENTIANÆ COMPOSITUM, N. F. IV. New.

Inf. Gent. Co.

Compound Infusion of Gentian. A mixture of gentian (3), coriander (0.8), and bitter orange peel (0.8), extracted with diluted alcohol (to make 25), and the percolate diluted with water (to make 100).

Average dose: 15 mils or 4 fluidrachms.

INFUSUM GENTIANÆ COMPOSITUM FORTIUS, N. F. III. Deleted.

See Infusum Gentianæ Compositum, N. F. IV.

INFUSUM PRUNI VIRGINIANÆ, N. F. IV. From U. S. P. VIII. Inf. Prun. Virg.

Infusion of Wild Cherry. A cold-water extract of wild cherry (4 w/v per cent) partially preserved with glycerin (5 v per cent).

Average dose: 60 mils or 2 fluidounces.

INFUSUM ROSÆ COMPOSITUM, N. F. IV.

Inf. Ros. Co.

Compound Infusion of Rose. Represents red rose (1.3), diluted sulphuric acid (0.9), sugar (4) and water (to make 100).

Average dose: 100 mils or 3 fluidounces.

INFUSUM SENNÆ COMPOSITUM, U. S. P. IX.

Inf. Senn. Co.

Compound Infusion of Senna, Black Draught. An infusion of a mixture of senna (6), manna (12), magnesium sulphate (12), fennel (2), and water (to make 100). Must be recently prepared.

Average dose: 120 mils or 4 fluidounces.

INULA, N. F. IV. Part II.

Inula.

Inula, Elecampane. The dried rhizome and roots of *Inula helenium* Linné without admixture of more than 5 per cent of its stem bases.

Average dose: 2 gm. or 30 grains.

Preparations: N. F.—*Pilulæ Antiperiodicæ*, *Pilulæ Antiperiodicæ sine Aloe*, *Tinctura Antiperiodica*, *Tinctura Antiperiodica sine Aloe*.

INUNCTUM MENTHOLIS, N. F. IV. New. Inunct. Menthol.

Menthol Inunction. A mixture of menthol (5) and wool fat (to make 100).

INUNCTUM MENTHOLIS COMPOSITUM, N. F. IV. New.

Inunct. Menthol Co.

Compound Menthol Inunction. A mixture of menthol (5), methyl salicylate (10), and hydrous wool fat (to make 100).

ODOFORMUM, U. S. P. IX.

Iodof.

Iodoform. Official in European pharmacopœias as *Jodoformium* (E). Triiodomethane, CHI_3 . Usually obtained by the action of iodine upon alcohol or acetone, in the presence of an alkali or alkali carbonate. Tests for identity and purity.

Average dose: 0.25 gm. or 4 grains.

Preparations: U. S. P.—*Unguentum Iodoformi*.

N. F.—*Collodium Iodoformi*, *Glycerogelatinum Iodoformi*, *Iodoformum Aromatisatum*, *Petroxolinum Iodoformi*.

ODOFORMUM AROMATISATUM, N. F. IV.

Iodof. Arom.

Aromatized Iodoform. A mixture of coumarin (4) and iodoform (to make 100).

IODOLUM, U. S. P. VIII. Deleted.

IODUM, U. S. P. IX.

Iodine. Official in European pharmacopœias as *Jodum* (E). Contains not less than 99.5 per cent of I. Tests for identity and purity and a method of assay.

Average dose: 0.005 gm. or $\frac{1}{12}$ grain.

Preparations: U. S. P.—*Liquor Iodi Compositus*, *Tinctura Iodi*, *Unguentum Iodi*. Used in making *Pilulæ Ferri Iodidi*, *Syrupus Ferri Iodidi*.

N. F.—*Collodium Iodi*, *Petroxolinum Iodi*, *Petroxolinum Iodi Dilutum*, *Tinctura Iodi Fortior*. Used in making *Linimentum Ammonii Iodidi*, *Phenol Iodatum*, *Sulphuris Iodidum*, *Syrupus Calcii Iodidi*, *Syrupus Ferri et Mangani Iodidi*, *Syrupus Iodotannicus*, *Tinctura Iodi Decolorata*.

IPECACUANHA, U. S. P. IX.

Ipecac.

Ipecac; included in the International Protocol as *Ipecacuanhæ Radix* (P. I.). Official in European pharmacopœias as *Radix Ipecacuanhæ* (E). The dried root of *Cephaelis Ipecacuanha* A. Richard, known in commerce as Rio Ipecac or of *Cephaelis acuminata*.

Karsten, known in commerce as Cartagena Ipecac, without admixture of more than 10 per cent of stems and yielding not less than 1.75 per cent of the ether-soluble alkaloids of ipecac. Rio Ipecac and Cartagena Ipecac described separately. Method of assay. Ipecac yields from 1.8 to 4.5 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparations: U. S. P.—Fluidextractum Ipecacuanhæ (which see). Pulvis Ipecacuanhæ et Opii.

N. F.—Pilulæ ad Prandium, Chapman's, Pilulæ Antidyspepticæ, Pilulæ Laxativæ Compositæ, Pilulæ Laxativæ Post Partum.

IRIS, N. F. IV. Part II.

Iris.

Orris, Orris Root. The dried rhizomes of *Iris florentina* Linné, *Iris germanica* Linné, or *Iris pallida* Lamarck, freed from the roots, peeled and dried. Yields from 2 to 5 per cent of ash.

Preparations: N. F.—Fluidextractum Stillingiæ Compositum, Species Pectorales.

IRIS VERSICOLOR, N. F. IV. Part II.

Iris Vers.

Blue Flag. The dried rhizome and roots of *Iris versicolor* Linné without admixture of more than 5 per cent of the roots and of leaf bases. Yields not more than 5 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparations: N. F.—Fluidextractum Iridis Versicoloris.

JALAPA, U. S. P. IX.

Jalap.

Jalap. Official in European pharmacopœias as *Tubera Jalapæ* (E). The dried tuberous root of *Exogonium Purga* Benthām, yielding not less than 7 per cent of the total resins of Jalap, and not more than 6.5 per cent of ash. Method of assay.

Average dose: 1 gm. or 15 grains.

Preparations: U. S. P.—Pulvis Jalapæ Compositus, Resina Jalapæ (which see).

N. F.—Extractum Jalapæ, Fluidextractum Jalapæ; Pilulæ ad Prandium, Pulvis Hydrargyri Chloridi Mitis et Jalapæ, Syrupus Sennæ Aromaticus, Tinctura Jalapæ, Tinctura Jalapæ Composita.

JUGLANS, N. F. IV. Part II.

Juglan.

Juglans, Butternut Bark, White Walnut Bark. The dried inner bark of the roots of *Juglans cinerea* Linné collected in the autumn. Yields not more than 8 per cent of ash.

Average dose: 4 gm. or 1 drachm.

Preparation: N. F.—Fluidextractum Juglandis.

JUNIPERUS, N. F. IV. Part II.

Junip.

Juniper Berries. The carefully dried ripe fruit of *Juniperus communis* Linné. Yields not more than 5 per cent of ash.

Average dose: 4 gm. or 1 drachm.

Preparations: N. F.—Fluidextractum Buchu Compositum (which see), Fluidextractum Juniperi.

KAOLINUM, N. F. IV. Part II. From U. S. P. VIII. Kaolin.

Kaolin. A native hydrated aluminum silicate, powdered and freed from gritty particles by elutriation. Tests for identity and purity.

Preparation: N. F.—Cataplasma Kaolini.

KAVA, N. F. IV. Part II. Kava.

Kava, Methysticum, Kava Kava. The rhizome and roots of *Piper methysticum* Forster. Yields not more than 8 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparation: N. F.—Fluidextractum Kavæ.

KINO, U. S. P. IX. Kino.

Kino, Malabar Kino, East India Kino. The spontaneously dried juice of *Pterocarpus Marsupium* Roxburgh. Yields not less than 45 per cent of alcoholic extractive and not more than 3 per cent of ash and contains not more than 12 per cent of moisture.

Average dose: 0.5 gm. or 8 grains.

Preparations: U. S. P.—Tinctura Kino.

N. F.—Pulvis Gambir Compositus, Pulvis Kino et Opii Compositus.

KOLA, N. F. IV. Part II. Kola.

Kola, Cola. The dried cotyledons of several species of *Cola* yielding not less than 1.5 per cent of caffeine and not more than 3 per cent of ash. Method of assay.

Average dose: 4 gm. or 1 drachm.

Preparation: N. F.—Fluidextractum Kolæ.

KRAMERIA, N. F. IV. Part II. From U. S. P. VIII. Kramer.

Krameria, Rhatany. Official in European pharmacopœias as Radix Ratanhiæ (E). The dried root of *Krameria triandra* Ruiz et Pavon, known in commerce as Peruvian Rhatany, or of *Krameria ixina* Linné, known in commerce as Savanilla Rhatany, or *Krameria argentea* Martius, known in commerce as Para or Brazilian Rhatany, without admixture of more than 5 per cent of stems and foreign matter. Yields not more than 5 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparations: N. F.—Extractum Krameriaë, Fluidextractum Krameriaë, Fluidglyceratum Krameriaë, Pulvis Gambir Compositus, Tinctura Krameriaë.

LAC FERMENTATUM, N. F. IV. Lac. Ferment.

Fermented milk, Kumyss. A mixture of cow's milk (100), and sugar (3.5) fermented by yeast.

LAC HUMANISATUM, N. F. III. Deleted.

LACTUCARIUM, U. S. P. IX.**Lactucar.**

Lactucarium. The dried milk-juice of *Lactuca virosa* Linné. Contains not more than 15 per cent of moisture and yields not more than 10 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparation: U. S. P.—**Tinctura Lactucarii** (which see).

LAC VACCINUM, N. F. IV. Part II.

Cow's Milk. The fresh milk of the domestic cow, *Bos taurus* Linné without modifications and complying with the legal standards.

Preparation: N. F.—**Lac Fermentatum.**

LAPPA, N. F. IV. Part II. From U. S. P. VIII.

Lappa, Burdock Root. The dried root of *Arctium Lappa* Linné, or of other species of *Arctium*, collected from plants of the first year's growth. Yields not more than 6 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparation: N. F.—**Fluidextractum Lappæ.**

LEPTANDRA, N. F. IV. Part II. From U. S. P. VIII. Leptand.

Leptandra, Culver's Root. The dried rhizome and roots of *Veronica virginica* Linné, without the presence or admixture of more than 5 per cent of stems and foreign matter. Yields not more than 12 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparations: N. F.—**Extractum Leptandræ, Fluidextractum Leptandræ.**

LIMONIS CORTEX, U. S. P. IX.**Limon. Cort.**

Lemon Peel. The outer rind of the fresh ripe fruit of *Citrus medica Limonum* Hooker filius.

Preparation: U. S. P.—**Tinctura Limonis Corticis** (which see).

LIMONIS SUCCUS, U. S. P. VIII. See Succus Citri, N. F. IV.**LINIMENTUM ACONITI ET CHLOROFORMI, N. F. IV.****Lin. Aconit. et Chlorof.**

Liniment of Aconite and Chloroform. A mixture of fluidextract of aconite (4.5), alcohol (8), chloroform (12.5), and soap liniment (to make 100).

LINIMENTUM AMMONIÆ, U. S. P. IX.**Lin. Ammon.**

Ammonia Liniment, Volatile Liniment, Hartshorn Liniment. Official in European pharmacopœias as **Linimentum Ammoniatum** (E). A mixture of ammonia water (25) and sesame oil (to make 100).

LINIMENTUM AMMONII IODIDI, N. F. IV.**Lin. Ammon. Iod.**

Liniment of Ammonium Iodide. A mixture of iodine (0.4), oil of rosemary (1.5), oil of lavender (1.5), camphor (3.2), ammonia water (11), and alcohol (to make 100).

LINIMENTUM BELLADONNÆ, U. S. P. IX. Lin. Bellad.

Belladonna Liniment. A solution of camphor (5) in fluidextract of belladonna root (to make 100).

LINIMENTUM CALCIS, U. S. P. IX. Lin. Calc.

Lime Liniment, Carron Oil. A mixture of lime water (50) and linseed oil (to make 100).

LINIMENTUM CAMPHORÆ, U. S. P. IX. Lin. Camph.

Camphor Liniment, Camphorated Oil. Official in European pharmacopœias as *Oleum Camphoratum* (E). Yields from 19.5 to 20.5 w/v per cent of camphor. A solution of camphor (20) in cotton seed oil (to make 100). Method of assay.

LINIMENTUM CANTHARIDIS, N. F. III. Deleted.

LINIMENTUM CHLOROFORMI, U. S. P. IX. Lin. Chlorof.

Chloroform Liniment. A solution of chloroform (30) in soap liniment (to make 100).

LINIMENTUM IODI, N. F. III. Deleted.

LINIMENTUM OPII COMPOSITUM, N. F. IV. Lin. Opii Co.

Compound Liniment of Opium, Canada Liniment. Now a mixture of tincture of opium (10), camphor (1.75), oil of peppermint (2.5), alcohol (25), fresh egg albumen (5), ammonia water (35), and oil of turpentine (to make 100).

LINIMENTUM PLUMBI SUBACETATIS, N. F. III. Deleted.

LINIMENTUM SAPONATO-CAMPHORATUM, N. F. IV.

Lin. Sapon.-Camph.

Camphorated Soap Liniment, Opodeldoc, Solid Opodeldoc. Now a solution of stearic acid soap (6), in water (10), mixed with camphor (2.5), oil of thyme (0.3), oil of rosemary (0.6), ammonia water (5), and alcohol (to make 100).

LINIMENTUM SAPONIS, U. S. P. IX. Lin. Sapon.

Soap Liniment, Liquid Opodeldoc. Official in European pharmacopœias as *Linimentum Saponato-Camphoratum Liquidum* (E), *Spiritus Saponis Camphoratus* (S). A solution of soap (6), camphor (4.5), oil of rosemary (1) in a mixture of alcohol (70) and water (to make 100).

Preparations: U. S. P.—*Linimentum Chloroformi*.

N. F.—*Linimentum Aconiti et Chloroformi*.

LINIMENTUM SAPONIS MOLLIS, U. S. P. IX. Lin. Sapon. Moll.

Liniment of Soft Soap, Tincture of Green Soap. Official in European pharmacopœias as *Spiritus Saponatus* (E). A solution of soft soap (65), oil of lavender (2) in alcohol (to make 100).

LINIMENTUM SAPONIS MOLLIS COMPOSITUM, N. F. IV.

Lin. Sapon. Moll. Co.

Compound Liniment of Soft Soap, Tinctura Saponis Viridis Composita, N. F. III. A solution of soft soap (15), oil of cade (2) in alcohol (to make 100).

LINIMENTUM SINAPIS COMPOSITUM, N. F. IV.

Lin. Sinap. Co.

Compound Liniment of Mustard. A mixture of volatile oil of mustard (3), fluidextract of mezereum (20), camphor (6), castor oil (15), and alcohol (to make 100).

LINIMENTUM TEREBINTHINÆ, U. S. P. IX.

Lin. Terebinth.

Turpentine Liniment, Kentish's Ointment, Kentish's Liniment. A solution of rosin cerate (65) in oil of turpentine (to make 100).

LINIMENTUM TEREBINTHINÆ ACETICUM, N. F. IV.

Lin. Terebinth. Acet.

Acetic Turpentine Liniment, Linimentum Album, Stoke's Liniment, St. John Long's Liniment. Now a mixture of oil of turpentine (40), oil of lemon (1.6), acetic acid (8), fresh egg (1), yolk of egg (1), and rose water (to make 100).

LINIMENTUM TIGLII, N. F. IV.

Lin. Tiglii.

Liniment of Croton Oil, Linimentum Crotonis. A mixture of croton oil (13), oil of cajuput (43), and alcohol (to make 100).

LINIMENTUM TIGLII COMPOSITUM, N. F. IV.

Lin. Tiglii Co.

Compound Croton Oil Liniment. A mixture of croton oil (20), oil of sassafras (20), oil of turpentine (20), and olive oil (to make 100).

LINUM, U. S. P. IX.

Linseed, Flaxseed. Official in European pharmacopœias as Semen Lini (E). The ripe seeds of *Linum usitatissimum* Linné without admixture of more than 3 per cent of other fruits and seeds or foreign matter. Yields not more than 6 per cent of ash.

Preparation: N. F.—Species Emollientes.

LIQUOR ACIDI ARSENOSI, U. S. P. IX.

Liq. Acid. Arsen.

Solution of Arsenous Acid, Hydrochloric solution of Arsenic, Solution of Arsenic Chloride. Contains arsenous acid equivalent to from 0.975 to 1.025 per cent of As_2O_3 . Made by dissolving arsenic trioxide in a mixture of diluted hydrochloric acid and distilled water (to make 100).

Average dose: 0.2 mil or 3 minims.

LIQUOR ALUMINI ACETATIS, N. F. III. See Liquor Alumini Subacetatis, N. F. IV.

LIQUOR ALUMINI ACETATIS, N. F. IV. New.

Liq. Alumin. Acet.

Solution of Aluminum Acetate, Liquor Burowii, Burow's Solution. Contains from 4.5 to 5.5 w/v per cent of neutral aluminum acetate, $Al(C_2H_3O_2)_3$. Directions for making and a method of assay.

LIQUOR ALUMINI ACETICO-TARTRATIS, N. F. IV.

Liq. Alumin. Acet.-Tart.

Solution of Aluminum Acetico-Tartrate. Alum precipitated by monohydrated sodium carbonate, the precipitate subsequently dissolved by a mixture of glacial acetic acid and tartaric acid. (Contains about 50 per cent of so-called aluminum acetico-tartrate.)

LIQUOR ALUMINI SUBACETATIS, N. F. IV. Liq. Alumin. Subacet.

Solution of Aluminum Subacetate, Liquor Alumini Acetatis, N. F. III. An aqueous solution containing from 7.5 to 8 per cent of basic aluminum acetate, $\text{Al}(\text{C}_2\text{H}_3\text{O}_2)_2\text{OH}$. Directions for making and a method of assay.

LIQUOR AMMONII ACETATIS, U. S. P. IX. Liq. Ammon. Acet.

Solution of Ammonium Acetate, Spirit of Mindererus; a similar preparation is official in European pharmacopœias as Ammonium Aceticum Solutum (E), Solutio Acetatis Ammonici (S). Contains not less than 7 per cent of $\text{NH}_4\text{C}_2\text{H}_3\text{O}_2$, with small amounts of acetic and carbonic acids. Made by dissolving ammonium carbonate in diluted acetic acid.

Average dose: 15 mils or 4 fluidrachms.

Preparation: U. S. P.—Liquor Ferri et Ammonii Acetatis.

LIQUOR AMMONII ACETATIS CONCENTRATUS, N. F. III. Deleted.**LIQUOR AMMONII CITRATIS, N. F. IV.** New. Liq. Ammon. Cit.

Solution of Ammonium Citrate. Citric acid (12.5) neutralized by ammonia water with distilled water to (make 100).

Average dose: 4 mils or 1 fluidrachm.

LIQUOR AMMONII CITRATIS FORTIOR, N. F. III. Deleted.**LIQUOR ANTIGERMINARUS, N. F. III.** Deleted.**LIQUOR ANTISEPTICUS, N. F. IV.** From U. S. P. VIII.

Liq. Antisept.

Antiseptic Solution. As modified, a solution of boric acid (2.5), thymol (0.1), eucalyptol (0.5), methyl salicylate (0.12), oil of thyme (0.03), sodium salicylate (0.12), sodium benzoate (0.6) in alcohol (30), and water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

LIQUOR ANTISEPTICUS ALKALINUS, N. F. IV. Liq. Antisept. Alk.

Alkaline Antiseptic Solution, Alkaline Antiseptic. As modified a solution of potassium bicarbonate (3.2), sodium benzoate (0.8), sodium borate (3.2), thymol (0.02), eucalyptol (0.02), oil of peppermint (0.02), oil of gaultheria (0.04), and cudbear (0.2) in alcohol (6), glycerin (15), and water (to make 100).

LIQUOR ARSENICALIS CLEMENS, N. F. IV. Liq. Arsen. Clemens.

Clemens' Solution of Arsenic, Solution of Potassium Arsenate and Bromide, *Liquor Potassii Arsenatis et Bromidi*, N. F. III. An aqueous solution containing arsenic corresponding to about 1 per cent of arsenic trioxide (As_2O_3) made by dissolving arsenic (1), potassium bicarbonate (4.05), bromine (0.5) in water (to make 100).

Average dose: 0.2 mil or 3 minims.

LIQUOR ARSENI ET HYDRARGYRI IODIDI, U. S. P. IX.

Liq. Arsen. et Hydrarg. Iod.

Solution of Arsenous and Mercuric Iodide, Donovan's Solution. Contains from 0.95 to 1.05 per cent of AsI_3 , and from 0.95 to 1.05 per cent of HgI_2 . Made by dissolving arsenous iodide (1) and red mercuric iodide (1) in distilled water (to make 100). Tests for identity and purity. Method of assay.

Average dose: 0.1 mil or $1\frac{1}{2}$ minims.

LIQUOR AURI ET ARSENI BROMIDI, N. F. IV.

Liq. Aur. et Arsen. Brom.

Solution of Gold and Arsenio Bromide. A solution of arsenic trioxide (0.25) and bromauric acid (0.325) with bromine (0.4) in distilled water (to make 100).

Average dose: 0.2 mil or 3 minims.

LIQUOR BENZOSULPHINIDI, N. F. III. Deleted.

LIQUOR BISMUTHI, N. F. IV.

Liq. Bism.

Solution of Bismuth. A mixture of glycerite of bismuth (12.5), alcohol (12.5), and distilled water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

LIQUOR BROMI, N. F. IV.

Liq. Brom.

Solution of Bromine, Smith's Solution of Bromine. A solution of bromine (8.3) and potassium bromide (12.5) in water (to make 100).

LIQUOR CALCEIS, U. S. P. IX.

Liq. Calc.

Solution of Calcium Hydroxide, Lime Water. Official in European pharmacopœias as *Aqua Calcaris* (E), *Solutio Hydratis Calcici* (S). Contains not less than 0.14 per cent of $\text{Ca}(\text{OH})_2$ at 25° . Made by dissolving lime in distilled water.

Average dose: 15 mils or 4 fluidrachms.

Preparations: U. S. P.—*Limimentum Calcis*.

N. F.—*Lotio Flava*, *Lotio Nigra*, *Pasta Zinci Mollis*.

LIQUOR CALCEIS SULPHURATÆ, N. F. IV.

Liq. Calc. Sulphurat.

Solution of Sulphurated Lime, Solution of Oxysulphuret of Calcium, *Vleminckx' Solution*, *Vleminckx' Lotion*. A mixture of lime (16.5) and sublimed sulphur (2.5) dissolved in boiling water (to make 100).

LIQUOR CARMINI, N. F. IV.

Liq. Carmin.

Solution of Carmine. Carmine (6.5) dissolved in a mixture of ammonia water (36.5), glycerin (36.5), and water (to make 100).

LIQUOR CHLORI COMPOSITUS, N. F. IV. From U. S. P. VIII.

Liq. Chlor. Co.

Compound Solution of Chlorine, Chlorine Water. Contains a mixture of chlorine and chlorine oxides equivalent to about 0.35 w/v per cent of chlorine. Should be freshly prepared. Directions for making and a method of assay.

Average dose: 4 mils or 1 fluidrachm.

LIQUOR COCCI, N. F. IV.

Liq. Cocci.

Cochineal Color. A solution of the coloring principle in cochineal (6.5) with potassium carbonate (3.2), alum (3.2), and potassium bitartrate (6.5) in a mixture of glycerin (50), alcohol (3.2), and water (to make 100).

LIQUOR COCCINEUS, N. F. III. See Liquor Cocci, N. F.**LIQUOR CRESOLIS COMPOSITUS, U. S. P. IX.**

Liq. Cresol. Co.

Compound Solution of Cresol. Official in European pharmacopœias as Liquor Cresoli Saponatus (E). A mixture of cresol (50), linseed oil (30), potassium hydroxide (8), alcohol (3), and water (to make 100). The KOH may be replaced by NaOH (5.4).

LIQUOR ELECTROPŒIUS, N. F. III. Deleted.**LIQUOR EXTRACTI GLYCERHIZÆ, N. F. III. Deleted.****LIQUOR FERRI ACETATIS, N. F. IV.**

Liq. Ferr. Acet.

Solution of Ferric Acetate. Now contains about 31 per cent of anhydrous ferric acetate, $\text{Fe}(\text{C}_2\text{H}_3\text{O}_2)_3$, corresponding to about 7.5 per cent of metallic iron (Fe). Directions for making and a method of assay.

Average dose: 0.3 mils or 5 minims.

LIQUOR FERRI ALBUMINATI, N. F. IV.

Liq. Ferr. Albumin.

Solution of Albuminate of Iron. Now a solution of fresh egg albumen (6), solution of ferric oxychloride (13), sodium citrate (1.25), in a mixture of aromatic elixir (40), alcohol (12), and water (to make 100).

Average dose: 8 mils or 2 fluidrachms.

LIQUOR FERRI CHLORIDI, U. S. P. IX.

Liq. Ferr. Chlor.

Solution of Ferric Chloride, Solution of Iron Perchloride. A similar preparation is official in European pharmacopœias as Liquor Ferri Sesquichlorati (E), Solutio Chloreti Ferrici (S). Contains ferric chloride corresponding to from 10 to 11 per cent of Fe. Made by dissolving iron in a mixture of hydrochloric acid and distilled water

and oxidizing by means of nitric acid. Tests for identity and purity. Method of assay.

Average dose: 0.1 mil or 1½ minims.

Preparations: U. S. P.—Ferri Chloridum, Tinctura Ferri Chlorida (which see).

N. F.—Ferri Oxidum Saccharatum, Gossypium Stypticum, Liquor Ferri Oxychloridi, Syrupus Ferri Protochloridi, Tinctura Ferri Chloridi Aetherea, Tinctura Ferri Citro-Chloridi.

LIQUOR FERRI CITRATIS, N. F. IV.

Liq. Ferr. Cit.

Solution of Ferric Citrate. Contains ferric citrate corresponding to not less than 7.25 per cent of metallic iron (Fe). Directions for making and a method of assay.

Average dose: 0.6 mil or 10 minims.

LIQUOR FERRI ET AMMONII ACETATIS, U. S. P. IX.

Liq. Ferr. et Ammon. Acet.

Solution of Iron and Ammonium Acetate, Basham's Mixture. A mixture of tincture of ferric chloride (4), diluted acetic acid (6), solution of ammonium acetate (50), aromatic elixir (12), glycerin (12), and distilled water (to make 100). Tests for identity and purity.

Average dose: 15 mils or 4 fluidrachms.

LIQUOR FERRI HYPOPHOSPHITIS, N. F. IV.

Liq. Ferr. Hypophos.

Solution of Ferric Hypophosphite, Solution of Hypophosphite of Iron. A solution of ferric hypophosphite (16.5) and potassium citrate (21.5) in a mixture of glycerin (15) and water (to make 100).

Average dose: 1 mil or 15 minims.

LIQUOR FERRI IODIDI, N. F. III. Deleted.

LIQUOR FERRI NITRATIS, N. F. IV.

Liq. Ferr. Nit.

Solution of Ferric Nitrate. Contains ferric nitrate corresponding to not less than 1.3 per cent of metallic iron. Directions for making and a method of assay.

Average dose: 0.3 mil or 5 minims.

LIQUOR FERRI OXYCHLORIDI, N. F. IV.

Liq. Ferr. Oxychlor.

Solution of Ferric Oxychloride. Made by precipitating a solution of ferric chloride (30) with ammonia water (60), washing the precipitate and dissolving in a mixture of hydrochloric acid (3) and distilled water (to make 100).

Average dose: 2 mils or 30 minims.

Preparations: N. F.—Liquor Ferri Albuminati, Liquor Ferri Peptonati, Liquor Ferri Peptonati cum Mangano.

LIQUOR FERRI OXYSULPHATIS, N. F. IV.

Liq. Ferr. Oxysulph.

Solution of Ferric Oxysulphate. A solution of ferrous sulphate (16.5 w/v per cent) in distilled water oxidized by means of nitric acid.

LIQUOR FERRI PEPTONATI, N. F. IV. **Liq. Ferr. Pepton.**

Solution of Peptonate of Iron. Now a solution of fresh egg albumen (9), digested with a mixture of pepsin and hydrochloric acid until peptonized, then mixed with a solution of sodium citrate (2), and solution of ferric oxychloride (12) in alcohol (15), syrup, glycerin, aromatics, and distilled water (to make 100).

Average dose: 8 mils or 2 fluidrachms.

LIQUOR FERRI PEPTONATI CUM MANGANO, N. F. III. See **Liquor Ferri Peptonati et Mangani, N. F.****LIQUOR FERRI PEPTONATI ET MANGANI, N. F. IV.**

Liq. Ferr. Pepton. et Mangan.

Solution of Peptonate of Iron and Manganese. **Liquor Ferri Peptonati cum Mangano, N. F. III.** Solution of Iron Peptonate with Manganese. Now a solution of fresh egg albumen (9), digested with a mixture of pepsin and hydrochloric acid until peptonized, then mixed with a solution of manganese citrate (1), sodium citrate (2), and solution of ferric oxychloride (12) in alcohol (15), syrup, glycerin, aromatics, and distilled water (to make 100).

Average dose: 8 mils or 2 fluidrachms.

LIQUOR FERRI PROTOCHLORIDI, N. F. IV. **Liq. Ferr. Protochlor.**

Solution of Ferrous Chloride, Solution of Protochloride of Iron. Made by dissolving iron in a mixture of hydrochloric acid (62.5), glycerin (25), diluted hypophosphorous acid (10), and distilled water (to make 100).

Average dose: 0.6 mil or 10 minims.

Preparation: N. F.—**Syrupus Ferri Protochloridi.**

LIQUOR FERRI SALICYLATIS, N. F. IV. **Liq. Ferr. Salicyl.**

Solution of Ferric Salicylate, Salicylated Mixture of Iron. A mixture of sodium salicylate (12.5), tincture of ferric citro-chloride (12.5), ammonium carbonate (0.65), citric acid (0.85), methyl salicylate (0.2), glycerin (17.5), and distilled water (to make 100).

Average dose: 8 mils or 2 fluidrachms.

LIQUOR FERRI SUBSULPHATIS, U. S. P. IX. **Liq. Ferr. Subsulph.**

Solution of Ferric Subsulphate, Monsel's Solution, Solution of Basic Ferric Sulphate. Contains basic ferric sulphate corresponding to from 13 to 14 per cent of Fe. Made by oxidizing a mixture of ferrous sulphate and sulphuric acid in distilled water, with nitric acid. Tests for identity and purity. Method of assay.

Average dose: 0.2 mil or 3 minims.

LIQUOR FERRI TERSULPHATIS, U. S. P. IX. **Liq. Ferr. Tersulph.**

Solution of Ferric Sulphate, Solution of Ferric Tersulphate, Solution of Iron Tersulphate. An aqueous solution containing normal

ferric sulphate corresponding to from 9.5 to 10.5 per cent of Fe. A solution of ferrous sulphate (50), sulphuric acid (0.6) in distilled water (to make 100), oxidized by means of nitric acid. Tests for identity and purity. Method of assay.

Preparations: U. S. P.—Ferri Hydroxidum cum Magnesii Oxido.

N. F.—Liquor Ferri Acetatis, Liquor Ferri Citratis, Liquor Ferri Nitratis, Magma Ferri Hydroxidi.

LIQUOR FORMALDEHYDI, U. S. P. IX.

Liq. Formaldehyd.

Solution of Formaldehyde. Official in European pharmacopœias as Formaldehydum Solutum (E), Solutio Formaldehydi (S). Contains not less than 37 per cent of CH_2O with varying amounts of methyl alcohol to prevent polymerization. Tests for identity and purity. Method of assay.

LIQUOR GUTTA PERCHÆ, N. F. IV.

Liq. Gut. Perch.

Solution of Gutta Percha. A solution of gutta percha (15) in chloroform (100), clarified by lead carbonate (17).

LIQUOR HYDRARGYRI ET POTASSII IODIDI, N. F. IV.

Liq. Hydrarg. et Pot. Iod.

Solution of Mercury and Potassium Iodide, Solution of Potassium Iodohydrargyrate, Channing's Solution. A solution of red mercuric iodide (1) and potassium iodide (0.8) in distilled water (to make 100).

Average dose: 0.2 mil or 3 minims.

LIQUOR HYDRARGYRI NITRATIS, N. F. IV. From U. S. P. VIII.

Liq. Hydrarg. Nit.

Solution of Mercuric Nitrate. Solution containing from 58 to 62 per cent of anhydrous mercuric nitrate, $\text{Hg}(\text{NO}_3)_2$, and about 11 per cent of free nitric acid. Directions for making and method of assay.

LIQUOR HYDRASTINÆ COMPOSITUS, N. F. IV. New.

Liq. Hydrastin. Co.

Compound Solution of Hydrastine, Colorless Hydrastine Solution. A solution of hydrastine hydrochloride (0.3), aluminum chloride (0.3), calcium chloride (0.3), magnesium chloride (0.3), potassium chloride (0.1), in a mixture of glycerin (50) and distilled water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

LIQUOR HYDROGENII DIOXIDI, U. S. P. IX.

Liq. Hydrog. Diox.

Solution of Hydrogen Dioxide, Solution of Hydrogen Peroxide. Aqua Hydrogenii Dioxidii, U. S. P. VIII, "Peroxide of Hydrogen." Official in European Pharmacopœias as Hydrogenium Hyperoxydatum Solutum (E). Contains not less than 3 per cent by weight of H_2O_2 , corresponding to not less than 10 volumes of available oxygen. May contain 0.04 w/v per cent of preservative. Tests for identity and purity and a method of assay.

Average dose: 4 mils or 1 fluidrachm.

LIQUOR HYPOPHOSPHITUM, N. F. IV.

Liq. Hypophos.

Solution of Hypophosphites. A solution of calcium hypophosphite (3.5), sodium hypophosphite (2), potassium hypophosphite (1.75), in a mixture of hypophosphorous acid (0.6) and distilled water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

LIQUOR HYPOPHOSPHITUM COMPOSITUS, N. F. IV.

Liq. Hypophos. Co.

Compound Solution of Hypophosphites. A solution of calcium hypophosphite (0.85), potassium hypophosphite (0.85), sodium hypophosphite (0.22), ferric hypophosphite (0.44), manganese hypophosphite (0.22), quinine hypophosphite (0.22), strychnine (0.0065), and potassium citrate (0.85), in a mixture of hypophosphorous acid (0.6), orange flower water, glycerin, and distilled water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

LIQUOR HYPOPHYSIS, U. S. P. IX. New.

Liq. Hypophysis.

Solution of Hypophysis, Solution of the Pituitary Body. Contains the water-soluble principle or principles from the fresh posterior lobe of the pituitary body of cattle. Made by extracting finely minced material with acidulated water. Biological test for activity.

Average dose: 1 mil or 15 minims.

LIQUOR IODI CARBOLATUS, N. F. III. See Liquor Iodi Phenolatus, N. F. IV.**LIQUOR IODI CAUSTICUS, N. F. III. Deleted.****LIQUOR IODI COMPOSITUS, U. S. P. IX.**

Liq. Iodi Co.

Compound Solution of Iodine, Lugol's Solution. Contains from 4.8 to 5.2 per cent of I and from 9.8 to 10.2 per cent of KI. Made by dissolving iodine (5) and potassium iodide (10) in distilled water (to make 100). Tests for identity and purity. Methods of assay for K.I and for I.

Average dose: 0.2 mil or 3 minims.

Preparation: N. F.—Liquor Iodi Phenolatus.

LIQUOR IODI PHENOLATUS, N. F. IV.

Liq. Iod. Phenol.

Phenolated Solution of Iodine, Liquor Iodi Carbolatus, N. F. III, Carbolized Solution of Iodine, Boulton's Solution (French Mixture). Now a mixture of compound solution of iodine (1.5), liquefied phenol (0.6), glycerin (16.5), and water (to make 100).

LIQUOR MAGNESII BROMIDI, N. F. III. Deleted.**LIQUOR MAGNESII CITRATIS, U. S. P. IX.**

Liq. Mag. Cit.

Solution of Magnesium Citrate. Contains magnesium citrate corresponding to not less than 1.5 w/v per cent of magnesium oxide. Made by dissolving magnesium carbonate (15), potassium bicarbonate

(2.5), citric acid (33), in a mixture of syrup (60), oil of lemon (0.1), and water (to make 1 bottle or about 350). Method of assay.

Average dose: 350 mils or 12 fluidounces.

LIQUOR MAGNESII SULPHATIS EFFERVESCENS, N. F. IV.

Liq. Mag. Sulph. Eff.

Effervescent Solution of Magnesium Sulphate. A mixture of magnesium sulphate (25), citric acid (4), syrup of citric acid (60), potassium bicarbonate (2.5), and distilled water (to make 1 bottle or about 350).

Average dose: The contents of one bottle.

LIQUOR MORPHINÆ CITRATIS, N. F. III. Deleted.

LIQUOR MORPHINÆ HYPODERMICUS, N. F. III. Deleted.

LIQUOR PANCREATICUS, N. F. III. See Liquor Pancreatini, N. F. IV.

LIQUOR PANCREATINI, N. F. IV.

Liq. Pancreat.

Solution of Pancreatin, Liquor Pancreaticus, N. F. III, Pancreatic Solution. A solution of pancreatin (1.75), sodium bicarbonate (5), in a mixture of glycerin (25), compound spirit of cardamom (0.35), alcohol (6.5), chloroform (0.2), and distilled water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

LIQUOR PEPSINI, N. F. IV.

Liq. Pepsin.

Solution of Pepsin. A mixture of glycerite of pepsin (5), hydrochloric acid (1), glycerin (31.5), and distilled water (to make 100).

Average dose: 8 mils or 2 fluidrachms.

LIQUOR PEPSINI ANTISEPTICUS, N. F. IV. New.

Liq. Pepsin. Antisept.

Antiseptic Solution of Pepsin (Physol). A solution of pepsin (5), aromatized by menthol, eucalyptol, and methyl salicylate, in a mixture of alcohol (1), glycerin (5), diluted hydrochloric acid (2), and distilled water (to make 100).

LIQUOR PEPSINI AROMATICUS, N. F. IV.

Liq. Pepsin. Arom.

Aromatic Solution of Pepsin. A solution of pepsin (1.75), with oil of cinnamon, oil of pimenta, and oil of cloves, in a mixture of alcohol (3.5), hydrochloric acid (1), glycerin (25), and distilled water (to make 100).

Average dose: 8 mils or 2 fluidrachms.

LIQUOR PHOSPHATUM ACIDUS, N. F. IV.

Liq. Phos. Acid.

Acid Solution of Phosphates, Solution of Acid Phosphates. Now a solution of precipitated calcium carbonate (5) and magnesium carbonate (0.5), in a mixture of phosphoric acid (12) and distilled water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

LIQUOR PHOSPHATUM COMPOSITUS, N. F. IV. New.

Liq. Phos. Co.

Stronger Compound Solution of Phosphates. A solution of precipitated calcium carbonate (7), ferric phosphate (3.5), ammonium phosphate (3.5), potassium bicarbonate (0.8), sodium bicarbonate (0.8), and citric acid (16.4), in a mixture of glycerin (37.5), phosphoric acid (14), orange flower water (25), and distilled water (to make 100).

Preparations: N. F.—Syrupus Phosphatum Compositus, Syrupus Phosphatum cum Quininae et Strychninae.

LIQUOR PHOSPHORI, N. F. IV.

Liq. Phosphor.

Solution of phosphorus, Thompson's Solution of Phosphorus. A solution of phosphorus (0.07) in a mixture of dehydrated alcohol (35), spirit of peppermint (0.5), and glycerin (to make 100).

Average dose: 0.6 mil or 10 minims.

LIQUOR PICIS ALKALINUS, N. F. IV.

Liq. Pic. Alk.

Alkaline Solution of Tar. A mixture of tar (25), potassium hydroxide (12.5), and water (to make 100).

LIQUOR PICIS CARBONIS, N. F. IV. New.

Liq. Pic. Carbon.

Coal Tar Solution. A mixture of coal tar (20) and the soluble constituents of quillaja (10) in alcohol (to make 100).

LIQUOR PLUMBI SUBACETATIS, U. S. P. IX. Liq. Plumb. Subacet.

Solution of Lead Subacetate, Goulard's Extract. Analogous preparations are official in European Pharmacopœias as Plumbum Subaceticum Solutum (E), Solutio Subacetatis Plumbici (S). Contains lead subacetate (approximately $\text{Pb}_2\text{O}(\text{CH}_3\text{COO})_2$), corresponding to not less than 18 per cent of Pb. Made by dissolving lead acetate (18) and lead oxide (11) in distilled water (to make 100). Tests for identity and purity.

Preparations: U. S. P.—Liquor Plumbi Subacetatis Dilutus.

N. F.—Ceratum Plumbi Subacetatis, Mistura Adstringens.

LIQUOR PLUMBI SUBACETATIS DILUTUS, U. S. P. IX.

Liq. Plumbi Subacet. Dil.

Diluted Solution of Lead Subacetate, Lead water. Similar preparations are official in European pharmacopœias as Aqua Plumbi (E), Aqua Saturnina (S). A mixture of solution of lead subacetate (4) and distilled water (to make 100).

LIQUOR POTASSÆ CHLORINATÆ, N. F. IV.

Liq. Pot. Chlorinat.

Solution of Chlorinated Potassa, Liquor Potassæ Chloratæ, Javelle Water. Made by treating a mixture of chlorinated lime (8) with water, with a solution of potassium carbonate (5.8) in water (to make 100).

LIQUOR POTASSII ARSENITIS, U. S. P. IX. Liq. Pot. Arsen.

Solution of Potassium Arsenite, Fowler's Solution, Liquor Arsenicalis, Arsenicalis Liquor Fowleri, P. I. Included in the International Protocol as Liquor Kalii Arsenicosi (P. I.). Official in European pharmacopœias as Liquor Arsenitis Kalici (S). Contains potassium arsenite, corresponding to from 0.975 to 1.025 per cent of As_2O_3 . Made by dissolving arsenic trioxide (1), potassium bicarbonate (2), compound tincture of lavender (3) in distilled water (to make 100). Tests for identity and a method of assay.

Average dose: 0.2 mil or 3 minims.

LIQUOR POTASSII ARSENATIS ET BROMIDI, N. F. III. See Liquor Arsenicalis, Clemens, N. F. IV.

LIQUOR POTASSII CITRATIS, U. S. P. IX. Liq. Pot. Cit.

Solution of Potassium Citrate. Contains not less than 8 per cent of $K_2C_6H_5O_7$, with small amounts of citric and carbonic acids. Made by dissolving potassium bicarbonate (8) and citric acid (6) in distilled water (to make 100). Tests for identity and a method of assay.

Average dose: 15 mils or 4 fluidrachms.

LIQUOR POTASSII HYDROXIDI, U. S. P. IX. Liq. Pot. Hydrox.

Solution of Potassium Hydroxide, Liquor Potassæ, Solution of Potassa. Analogous preparations are official in European pharmacopœias as Liquor Kali Caustici (E). Contains not less than 4.5 per cent of KOH. Made by dissolving potassium hydroxide (6), in distilled water (to make 100). Tests for identity and a method of assay.

Average dose: 1 mil or 15 minims.

Preparations: N. F.—Elixir Catharticum Compositum, Glyceritum Guaiaci, Mistura Copaiba, Syrupus Eriodictyi Aromaticus.

LIQUOR SACCHARINI, N. F. III. Deleted.

LIQUOR SERIPARUS, N. F. III. Deleted.

LIQUOR SODÆ CHLORINATÆ, U. S. P. IX. Liq. Sod. Chlorinat.

Solution of Chlorinated Soda, Labarraque's Solution. Contains not less than 2.5 per cent of available chlorine. Made by decomposing chlorinated lime (10) with monohydrated sodium carbonate and water (to make 100). Tests for identity and a method of assay.

LIQUOR SODÆ ET MENTHÆ, N. F. IV. Liq. Sod. et Menth.

Solution of Soda and Mint, Mistura Sodæ et Menthæ, N. F. III, Soda Mint. A solution of sodium bicarbonate (5), in aromatic spirit of ammonia (1) and spearmint water (to make 100). When preferred peppermint water may be used in place of the spearmint water.

Average dose: 8 mils or 2 fluidrachms.

LIQUOR SODII ARSENATIS, U. S. P. IX. Liq. Sod. Arsen.

Solution of Sodium Arsenate. Contains from 0.975 to 1.025 per cent of Na_2HAsO_4 . Made by dissolving exsiccated sodium arsenate (1) in distilled water (to make 100). Tests for identity and purity and a method of assay.

Average dose: 0.2 mil or 3 minims.

LIQUOR SODII ARSENATIS, PEARSON, N. F. IV.

Liq. Sod. Arsen. Pearson.

Pearson's Solution of Sodium Arsenate. Now a solution of exsiccated sodium arsenate (0.1) in distilled water (to make 100). This solution is only 1/10 the strength of the *Liquor Sodii Arsenatis*, U. S. P.

Average dose: 2 mil or 30 minims.

LIQUOR SODII BORATIS COMPOSITUS, N. F. IV. Liq. Sod. Bor. Co.

Compound Solution of Sodium Borate, Dobell's Solution. A solution of sodium borate (1.5), sodium bicarbonate (1.5), liquefied phenol (0.3) in a mixture of glycerin (3.5) and water (to make 100).

LIQUOR SODII CARBOLATIS, N. F. III. Deleted.

LIQUOR SODII CHLORIDI PHYSIOLOGICUS, U. S. P. IX. New.

Liq. Sod. Chlor. Physio.

Physiological Solution of Sodium Chloride, Physiological Salt Solution, Normal Salt Solution, *Solutio Salina*, Normal Saline Solution, Isotonic Salt Solution. Made by dissolving sodium chloride (0.85) in distilled water (to make 100).

LIQUOR SODII CITRATIS, N. F. IV.

Liq. Sod. Cit.

Solution of Sodium Citrate, *Mistura Sodii Citratis*, *Saturatio vel Potio Riverii*. A solution of citric acid (2) and sodium bicarbonate (2.5) in distilled water (to make 100).

Average dose: 8 mils or 2 fluidrachms.

LIQUOR SODII CITRO-TARTRATIS EFFERVESCENS, N. F. IV.

Liq. Sod. Citro-Tart. Eff.

Effervescent Solution of Sodium Citro-Tartrate. A solution of sodium bicarbonate (26), tartaric acid (24), and citric acid (2), in a mixture of syrup of citric acid (50) and distilled water (to make one bottle or about 350).

Average dose: The contents of one bottle.

LIQUOR SODII GLYCEROPHOSPHATIS, U. S. P. IX. New.

Liq. Sod. Glycerophos.

Solution of Sodium Glycerophosphate. An aqueous solution corresponding to not less than 50 per cent of the anhydrous salt $\text{Na}_2\text{C}_2\text{H}_4\text{PO}_6$. Tests for identity and purity and a method of assay.

Average dose: 0.35 mil or 6 minims.

Preparations: See under *Sodii Glycerophosphas*.

LIQUOR SODII HYDROXIDI, U. S. P. IX. Liq. Sod. Hydrox.

Solution of Sodium Hydroxide, *Liquor Sodæ*, Solution of Soda. An analogous preparation is official in European pharmacopœias as *Liquor Natri Caustici* (E). Contains not less than 4.5 per cent of NaOH. Made by dissolving sodium hydroxide (5.6) in distilled water (to make 100). Tests for identity and a method of assay.

Average dose: 1 mil or 15 minims.

Preparations: N. F.—*Ferri Oxidum Saccharatum*, *Liquor Ferri Peptonati*, *Liquor Ferri Peptonati et Mangani*.

LIQUOR SODII OLEATIS, N. F. III. Deleted.

LIQUOR SODII PHOSPHATIS COMPOSITUS, N. F. IV. From U. S. P. VIII.

Liq. Sod. Phos. Co.
Compound Solution of Sodium Phosphate. As modified, a solution of sodium phosphate (100), citric acid (13), in a mixture of glycerin (15) with water (to make 100). Sodium nitrate omitted from formula.

Average dose: 8 mils or 2 fluidrachms.

LIQUOR STRYCHNINÆ ACETATIS, N. F. IV. Liq. Strych. Acet.

Solution of Strychnine Acetate, Hall's Solution of Strychnine. Now a solution of strychnine (0.178) in a mixture of diluted acetic acid (3.5), alcohol (25), compound tincture of cardamom (1), and distilled water (to make 100).

Average dose: 0.6 mil or 10 minims.

LIQUOR ZINCI CHLORIDI, U. S. P. IX. Liq. Zinc. Chlor.

Solution of Zinc Chloride. Contains from 48.5 to 52 per cent of $ZnCl_2$. Made by dissolving zinc (24) in a mixture of hydrochloric acid (84) and nitric acid (12) and then adding precipitated zinc carbonate to clarify the solution. Tests for identity and purity and a method of assay.

LIQUOR ZINCI ET ALUMINI COMPOSITUS, N. F. IV.

Liq. Zinc. et Alumin. Co.

Compound Solution of Zinc and Aluminum. A solution of zinc sulphate (20), aluminum sulphate (20), betanaphthol (0.06), and oil of thyme (0.2) in distilled water (to make 100).

LIQUOR ZINCI ET FERRI COMPOSITUS, N. F. IV.

Liq. Zinc. et Ferr. Co.

Compound Solution of Zinc and Iron, Deodorant Solution. A solution of zinc sulphate (20), ferrous sulphate (20), copper sulphate (6.5), betanaphthol (0.06), oil of thyme (0.2) in a mixture of hypophosphorous acid (0.4) and water (to make 100).

LIQUOR ZINGIBERIS, N. F. III. Deleted.

LITHII BENZOAS, U. S. P. VIII. Deleted.

LITHII BROMIDUM, U. S. P. IX.

Lith. Brom.

Lithium Bromide. Now contains not less than 85 per cent of LiBr. Tests for identity and purity and a method of assay.

Average dose: 1 gm. or 15 grains.

Preparations: N. F.—Elixir Lithii Bromidi, Syrupus Bromidorum.

LITHII CARBONAS, U. S. P. IX.

Lith. Carb.

Lithium Carbonate. Official in European pharmacopœias as Lithium Carbonicum (E), Carbonas Lithicus (S). Contains when dried not less than 98.5 per cent of Li_2CO_3 . Tests for identity and purity and a method of assay.

Average dose: 0.5 gm. or 8 grains.

Preparations: N. F.—Used in making Elixir Formatum Compositum, Sal Potassii Bromidi Effervescens Compositus, Sal Vichyani Factitium Effervescens et Lithii.

LITHII CITRAS, U. S. P. IX.

Lith. Cit.

Lithium Citrate. Contains not less than 98.5 per cent of $\text{Li}_2\text{C}_6\text{H}_5\text{O}_7 + 4\text{H}_2\text{O}$. Tests for identity and purity and a method of assay.

Average dose: 0.5 gm. or 8 grains.

Preparations: N. F.—Elixir Lithii Citratis, Sal Lithii Citras Effervescens.

LITHII CITRAS EFFERVESCENS, U. S. P. VIII. See Sal Lithii Citras Effervescens, N. F. IV.

LITHII SALICYLAS, N. F. IV. Part II. From U. S. P. VIII.

Lith. Salicyl.

Lithium Salicylate. Contains when dried not less than 98.5 per cent of $\text{LiC}_7\text{H}_5\text{O}_3$. Tests for identity and purity and a method of assay.

Average dose: 1 gm. or 15 grains.

Preparation: N. F.—Elixir Lithii Salicylatis.

LOBELIA, U. S. P. IX.

Lobel.

Lobelia, Indian Tobacco. Official in European pharmacopœias as *Herba Lobeliæ* (E). The dried leaves and flowering tops of *Lobelia inflata* Linné without admixture of more than 10 per cent of stems and other foreign matter. Yields not more than 8 per cent of ash.

Average dose: 0.15 gm. or $2\frac{1}{2}$ grains.

Preparations: U. S. P.—Fluidextractum Lobeliæ, Tinctura Lobeliæ.

LOTIO ADSTRINGENS, N. F. III. Deleted.

LOTIO AMMONIACALIS CAMPHORATA, N. F. IV. Lot. Ammon. Camph.

Ammoniated Camphor Wash, Aqua Sedativa, N. F. III. Sedative Water, Eau Sédative de Raspail. A solution of sodium chloride (6)

in a mixture of ammonia water (6), spirit of camphor (1) and water (to make 100).

LOTIO FLAVA, N. F. IV.

Lot. Flav.

Yellow Lotion, Yellow Wash, Aqua Phagedænica Flava. A mixture of a solution of corrosive mercuric chloride (0.3) with solution of calcium hydroxide (to make 100).

LOTIO NIGRA, N. F. IV.

Lot. Nigr.

Black Lotion, Black Wash, Aqua Phagedænica Nigra. A mixture of mild mercurous chloride (0.875) with water and solution of calcium hydroxide (to make 100).

LOTIO PLUMBI ET OPII, N. F. IV.

Lot. Plumb. et Opii.

Lotion of Lead and Opium, Lead and Opium Wash. A solution of lead acetate (1.75) with tincture of opium (3.5) in water (to make 100).

LUPULINUM, N. F. IV. Part II. From U. S. P. VIII. Lupul.

Lupulin. The glandular trichomes separated from the strobiles of *Humulus lupulus* Linné. Yields not more than 16 per cent of ash. Average dose: 0.5 gm. or 8 grains.

Preparations: N. F.—Fluidextractum Lupulini, Oleoresina Lupulini.

LYCOPodium, U. S. P. IX.

Lycopod.

Lycopodium. The spores of *Lycopodium clavatum* Linné without admixture of more than 2 per cent of impurities. Yields not more than 3 per cent of ash.

MACIS, N. F. IV. Part II.

Mace. The arillode of the seed of *Myristica fragrans* Houtuyn. Yields not less than 8 per cent of volatile ether extract and from 20 to 30 per cent of non-volatile ether extract. Mace yields not more than 3 per cent of ash which is almost completely soluble in HCl.

Average dose: 0.5 gm. or 8 grains.

Preparation: N. F.—Elixir Rubi Compositum.

MAGMA BISMUTHI, U. S. P. IX. New.

Magma Bism.

Bismuth Magma, Milk of Bismuth. Yields from 5.6 to 6.2 per cent of Bi_2O_3 . Made by precipitating a solution of bismuth subnitrate in nitric acid with a solution of ammonium carbonate in ammonia water and distilled water. Tests for identity and a method of assay.

Average dose: 4 mills or 1 fluidrachm.

MAGMA FERRI HYDROXIDI, N. F. IV. From U. S. P. VIII.

Magm. Ferr. Hydrox.

Ferric Hydroxide Magma, Ferri Hydroxidum U. S. P. VIII. Ferric Hydroxide. A solution of ferric sulphate (33) precipitated with a mixture of ammonia water (47) and water (to make 100).

MAGMA MAGNESIÆ, U. S. P. IX. From N. F. III. Magma Mag.

Magnesia Magma, Milk of Magnesia. Yields from 6.5 to 7.5 per cent of $\text{Mg}(\text{OH})_2$. Made by treating a mixture of magnesium carbonate and water with Sodium hydroxide. Tests and a method of assay.

Average dose: 10 mils or $2\frac{1}{2}$ fluidrachms.

MAGNESII CARBONAS, U. S. P. IX.

Mag. Carb.

Magnesium Carbonate. Official in European pharmacopœias as **Magnesium Carbonicum (E)**, **Hydratocarbonas Magnesticus (S)**. A mixture of hydrated magnesium carbonate and magnesium hydroxide corresponding to not less than 39.2 per cent MgO , and not more than 0.8 per cent of CaO . Tests for identity and purity and a method of assay.

Average dose: 3 gm. or 45 grains.

Preparations: U. S. P.—Used in making **Liquor Magnesii Citratis**, **Magma Magnesiae**, **Syrupus Picis Liquidæ**, **Syrupus Tolutanus**, **Syrupus Zingiberis**.

N. F.—**Mistura Carminativa**, **Mistura Magnesiae**, **Asafœtidæ et Opii**. Used in making **Elixir Eriodictyi Aromaticum**, **Elixir Formatum Compositum**, **Glyceritum Picis Liquidæ**, **Liquor Antisepticus Alkalinus**, **Liquor Pancreatini**, **Liquor Phosphatum Acidus**, **Syrupus Eriodictyi Aromaticus**.

MAGNESII CHLORIDUM, NF. IV. Part II.

Magnes. Chlorid.

Magnesium Chloride. Contains not less than 95 per cent of $\text{MgCl}_2 + 6\text{H}_2\text{O}$. Tests for identity and purity.

Average dose: 15 gm. or 4 drachms.

Preparation: N. F.—**Liquor Hydrastinæ Compositus**.

MAGNESII CITRAS EFFERVESCENS, N. F. III. Deleted.**MAGNESII OXIDUM, U. S. P. IX.**

Mag. Oxid.

Magnesium Oxide, Magnesia, Calcined Magnesia, Light Magnesia. Official in European pharmacopœias as **Magnesii Oxidum (E)**, **Oxydum Magnesticum Leve (S)**. Contains after ignition not less than 96 per cent of MgO and not more than 2 per cent of CaO . Tests for identity and purity and a method of assay.

Average dose: 2 gm. or 30 grains.

Preparations: U. S. P.—Used in making **Ferri Hydroxidum cum Magnesii Oxido**, **Fluidextractum Cascaræ Sagradæ**, **Aromaticum**.

N. F.—**Massa Copaibæ**, **Pulvis Rhei et Magnesiae Anisatus**.

MAGNESII OXIDUM PONDEROSUM, U. S. P. IX. Mag. Oxid. Pond.

Heavy Magnesium Oxide, Heavy Magnesia. Official in European pharmacopœias as **Oxydum Magnesticum Ponderosum (S)**. Contains after ignition not less than 96 per cent of MgO nor more than 2 per cent of CaO . Responds to the tests under magnesium oxidum.

Average dose: 2 gm. or 30 grains.

MAGNESII SULPHAS, U. S. P. IX.**Mag. Sulph.**

Magnesium Sulphate, Epsom Salt. Official in European pharmacopœias as Magnesium Sulfuricum (E), Sulfas Magnesicus (S). Contains from 48.59 to 53.45 per cent of anhydrous magnesium sulphate, corresponding to not less than 99.5 per cent of the crystallized salt, $\text{MgSO}_4 + 7\text{H}_2\text{O}$. Tests for identity and purity and a method of assay.

Average dose: 15 gm. or 4 drachms.

Preparations: U. S. P.—Infusum Sennæ Compositum.

N. F.—Liquor Magnesii Sulphatis Effervescens, Sal Kissingense Factitium (which see), Sal Vichyanum Factitium (which see).

MAGNESII SULPHAS EFFERVESCENS, U. S. P. VIII. Deleted.**MALTUM, U. S. P. IX.****Malt.**

Malt. The grain of one or more varieties of *Hordeum sativum* Jessen, partially germinated artificially and then dried at a temperature not exceeding 55° . It is capable of converting not less than 5 times its weight of starch into sugars. Tests for identity and purity and a method of assay.

Preparation: U. S. P.—Extractum Malti.

MALVÆ FOLIA, N. F. IV. Part II. From U. S. P. VIII.**Malv. Fol.**

Mallow Leaves. The dried leaves of *Malva sylvestris* Linné, and *Malva rotundifolia* Linné. Yields not more than 16 per cent of ash.

Preparation: N. F.—Species Emollientes.

MANGANI CITRAS SOLUBILIS, N. F. IV. Part II. Mang. Cit. Sol.

Soluble Manganese Citrate, Manganese and Sodium Citrate. Contains when dried from 49 to 51 per cent of $\text{Mn}_2(\text{C}_6\text{H}_5\text{O}_7)_2$. Tests for identity and purity and a method of assay.

Average dose: 0.2 gm. or 3 grains.

Preparation: N. F.—Liquor Ferri Peptonati et Mangani.

MANGANI DIOXIDUM PRÆCIPITATUM, U. S. P. IX.**Mangan. Diox. Præc.**

Precipitated Manganese Dioxide. Consists chiefly of manganese dioxide with small amounts of other oxides of manganese, corresponding to not less than 80 per cent of MnO_2 . May be made by precipitating a strong solution of manganese sulphate with a mixture of ammonia water and solution of hydrogen dioxide. Tests for identity and purity and a method of assay.

Average dose: 0.25 gm. or 4 grains.

MANGANI GLYCEROPHOSPHAS SOLUBILIS, N. F. IV. Part II.**Mangan. Glycerophos. Sol.**

Soluble Manganese Glycerophosphate, Soluble Manganous Glycerophosphate. A mixture consisting of from 70 to 75 per cent of

$\text{MnC}_2\text{H}_3\text{PO}_4$ and citric acid. Tests for identity and purity and a method of assay.

Average dose: 0.2 gm. or 3 grains.

Preparation: N. F.—Elixir Glycerophosphatum Compositum.

MANGANI HYPOPHOSPHIS, N. F. IV. Part II. From U. S. P. VIII.

Mangan. Hypophos.

Manganese Hypophosphite. Contains not less than 97 per cent of $\text{Mn}(\text{PH}_2\text{O}_2)_2 + \text{H}_2\text{O}$. Tests for identity and purity and a method of assay.

Average dose: 0.2 gm. or 3 grains.

Preparations: N. F.—Liquor Hypophosphitum Compositus, Syrupus Hypophosphitum Compositus.

MANGANI SULPHAS, N. F. IV. Part II. From U. S. P. VIII.

Mangan. Sulph.

Manganese Sulphate. Contains not more than 38 per cent of water and from 62 to 68 per cent of MnSO_4 . Tests for identity and purity and a method of assay.

Average dose: 0.2 gm. or 3 grains.

Preparation: N. F.—Syrupus Ferri et Mangani Iodidi.

MANNA, U. S. P. IX.

Manna. The dried saccharine exudation of *Fraxinus Ornus* Linné. Tests for mannite.

Average dose: 15 gm. or 4 drachms.

Preparations: U. S. P.—Infusum Sennæ Compositum.

N. F.—Syrupus Mannæ.

MARRUBIUM, U. S. P. VIII. Deleted.

MASSA COPAIBÆ, N. F. IV.

Mass. Copaib.

Mass of Copaiba, Solidified Copaiba. A mixture of copaiba (94) and magnesia (6).

Average dose: 0.1 gm. or 15 grains.

MASSA FERRI CARBONATIS, U. S. P. IX.

Mass. Ferr. Carb.

Mass of Ferrous Carbonate, Vallet's Mass. Contains not less than 35 per cent of FeCO_3 . Made by precipitating a solution of ferrous sulphate (100) in water with an aqueous solution of monohydrated sodium carbonate, washing, and adding clarified honey and sugar to make a mass. Method of assay.

Average dose: 0.25 gm. or 4 grains.

MASSA HYDRARGYRI, U. S. P. IX.

Mass. Hydrarg.

Mass of Mercury, Blue Mass, Blue Pill. Contains from 32 to 34 per cent of Hg. Made by mixing mercury (33), oleate of mercury (1), glycyrrhiza (10), althæa (15), glycerin (9), and honey of rose (to make 100). Method of assay.



Average dose: 0.25 gm. or 4 grains.

Preparations: N. F.—*Pilulæ ad Prandium*, Cole's, *Pilulæ Aloes Hydrargyri et Podophylli*, *Pilulæ Aloes Hydrargyri et Scammonii Compositæ*, *Pilulæ Antidyspepticæ*, *Pilulæ Digitalis Scillæ et Hydrargyri*.

MASTICHE, N. F. IV. Part II. From U. S. P. VIII. Mastic.

Mastic. A concrete resinous exudation from *Pistacia lentiscus* Linné. Is completely soluble in ether and almost completely soluble in alcohol.

Average dose: 2 gm. or 30 grains.

Preparations: N. F.—*Pilulæ ad Prandium*, Chapman's, *Pilulæ Aloes et Mastiches*.

MATICO, N. F. IV. Part II. From U. S. P. VIII. Matic.

Matico. The dried leaves of *Piper angustifolium* Ruiz et Pavon, without admixture of more than 5 per cent of stems, flower spikes, and foreign matter. Yields not more than 18 per cent of ash.

Average dose: 4 gm. or 1 drachm.

Preparation: N. F.—*Fluidextractum Matico*.

MATRICARIA, U. S. P. IX.

Matricaria, German Chamomile, Wild Chamomile. Official in European Pharmacopœias as *Flores Chamomilæ* (E), *Flos Chamomilæ* (S). The dried flower-heads of *Matricaria Chamomilla* Linné without admixture of more than 5 per cent of stems and foreign matter.

Average dose: 15 gm. or 4 drachms.

Preparation: N. F.—*Species Emollientes*.

MEL, U. S. P. IX.

Honey. A saccharine secretion deposited in honeycomb by the bee, *Apis mellifera* Linné. Tests for identity and purity.

Preparation: U. S. P.—*Mel Depuratum* (which see).

MEL DEPURATUM, U. S. P. IX.

Mel Depurat.

Clarified Honey, Honey clarified by diluting, heating, filtering, and reconcentrating.

Preparations: U. S. P.—*Massa Ferri Carbonatis*, *Mel Rosæ*.

N. F.—*Confectio Rosæ*, *Gargarisma Guaiaci Composita*, *Mel Sodii Boratis*, *Mistura Guaiaci*, *Oxymel Scillæ*, *Pilulæ Digitalis*, *Scillæ et Hydrargyri*, *Pilulæ Opii*, *Digitalis et Quininæ*.

MELILOTUS, N. F. IV. Part II.

Melilot.

Melilot, Yellow Melilot, Yellow Sweet Clover. The dried leaves and flowering tops of *Melilotus officinalis* Lamarck. Yields not more than 10 per cent of ash.

Preparation: N. F.—*Species Emollientes*.

MEL ROSÆ, U. S. P. IX.

Honey of Rose. A mixture of fluid extract of rose (12) with clarified honey (to make 100).

Average dose: 4 mls or 1 fluidrachm.

Preparations: U. S. P.—Massa Hydrargyri.

N. F.—Mel Rosæ et Sodii Boratis.

MEL ROSÆ ET SODII BORATIS, N. F. IV. New.

Mel. Ros. et Sod. Bor.

Honey of Rose with Sodium Borate, Honey of Rose with Borax. A solution of sodium borate (10) in a mixture of glycerin (5) and honey of rose (85).

MEL SODII BORATIS, N. F. IV. New.

Mel. Sod. Bor.

Honey of Sodium Borate, Mel Boracis, Honey and Borax. A solution of sodium borate (10) in a mixture of glycerin (5) and clarified honey (85).

MENTHA PIPERITA, U. S. P. IX.

Menth. Pip.

Peppermint. Official in European pharmacopœias as *Folia Menthæ Piperitæ* (E). The dried leaves and flowering tops of *Mentha piperita* Linné.

Average dose: 4 gm. or 60 grains.

Preparation: U. S. P.—Spiritus Menthæ Piperitæ. (See also Oleum Menthæ Piperitæ.)

MENTHA VIRIDIS, U. S. P. IX.

Menth. Vir.

Spearmint. The dried leaves and flowering tops of *Mentha spicata* Linné.

Average dose: 4 gm. or 60 grains.

Preparation: U. S. P.—Spiritus Menthæ Viridis. (See also Oleum Menthæ Viridis.)

MENTHOL, U. S. P. IX.

Menthol.

Menthol. A secondary alcohol, $C_{10}H_{19}OH$ obtained from oil of peppermint or other mint oils. It melts between 42° and 44° . Tests for identity and purity.

Average dose: 0.06 gm. or 1 grain.

Preparations: N. F.—Inunctum Mentholis, Inunctum Mentholis Compositum, Liquor Antisepticus, Liquor Pepsini Antisepticus, Menthol Camphoratum, Nebula Aromaticæ, Nebula Mentholis, Nebula Metholis Composita, Petroxolinum Mentholis, Pulvis Antisepticus.

MENTHOL CAMPHORATUM, N. F. IV.

Menthol. Camph.

Camphorated Menthol, Campho Menthol, N. F. III. Camphor and Menthol. Now a mixture of camphor (47.5), menthol (47.5), and alcohol (to make 100).

MENYANTHES, N. F. IV. Part II.

Menyanth.

Menyanthes, Buckbean, Marsh Trefoil. The dried leaves of *Menyanthes trifoliata* Linné. Yields not more than 10 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparation: N. F.—Vinum Aurantii Compositum.

METHYLIS SALICYLAS, U. S. P. IX.

Methyl. Salicyl.

Methyl Salicylate, Oleum Gaultheriæ, U. S. P. VIII, Oil of Wintergreen, Oleum Betulæ, U. S. P. VIII, Oil of Sweet Birch, Oil of Tea-berry. Contains not less than 98 per cent of $\text{CH}_3\text{C}_7\text{H}_5\text{O}_2$. It is produced synthetically or is obtained by distillation from *Gaultheria procumbens* Linné or from *Betula lenta* Linné. The label must indicate its nature and origin. Specific gravity of natural oil, 1.172 to 1.182 of synthetic product 1.180 to 1.185. It boils between 218° and 221° . Tests for identity and purity and a method of assay.

Average dose: 0.75 mil or 12 minims.

Preparations: U. S. P.—Emulsum Olei Morrhuæ, Fluidextractum Cascariæ Sagradæ Aromaticum, Syrupus Sarsaparillæ Compositus.

N. F.—Cataplasma Kaolini, Inunctum Mentholis Compositum, Liquor Antisepticus, Liquor Antisepticus Alkalinus, Nebula Aromatica, Nebula Mentholis Composita, Petroxolinum Methylis Salicylates. (Also as flavoring in other preparations.)

METHYLTHIONINÆ CHLORIDUM, U. S. P. IX. Methylthionin. Chlor.

Methylthionine Chloride, Methylene Blue, Methylthioninæ Hydrochloridum, U. S. P. VIII. Tetramethylthionine chloride, $\text{C}_{16}\text{H}_{18}\text{N}_2\text{ClS} + 3\text{H}_2\text{O}$. Tests for identity and purity.

Average dose: 0.15 or $2\frac{1}{2}$ grains.

METHYLTHIONINÆ HYDROCHLORIDUM, U. S. P. VIII.

See Methylthioninæ Chloridum, U. S. P. IX.

MEZEREUM, U. S. P. IX.

Mezereum, Mezereon. The dried bark of *Daphne mezereum* Linné.

Preparation: U. S. P.—Fluidextractum Sarsaparillæ Compositum.

N. F.—Fluidextractum Mezerei.

MISTURA ACACIÆ, N. F. III. Deleted.

MISTURA ADSTRINGENS, N. F. IV.

Mist. Adstring.

Astringent Mixture, Mistura Adstringens et Escharotica, N. F. III, Villate's Mixture. A solution of copper sulphate (6.5) and zinc sulphate (6.5) in a mixture of solution of lead subacetate (10) and diluted acetic acid (to make 100).

MISTURA ADSTRINGENS ET ESCHAROTICA, N. F. III. See Mistura Adstringens, N. F. IV.

MISTURA AMMONII CHLORIDI, N. F. IV. Mist. Ammon. Chlor.

Mixture of Ammonium Chloride, *Mistura Solvens Simplex*. A solution of ammonium chloride (2.5), pure extract of glycyrrhiza (2.5), pure extract of glycyrrhiza (2.5) in water (to make 100).

Average dose: 8 mils or 2 fluidrachms.

MISTURA CAMPHORÆ ACIDA, N. F. IV. Mist. Camph. Acid.

Acid Camphor Mixture, *Mistura Antidysenterica*, Hope's Mixture. A mixture of nitric acid (17.5), tincture of opium (1.2), and camphor water (to make 100).

Average dose: 8 mils or 2 fluidrachms.

MISTURA CAMPHORÆ AROMATICA, N. F. IV. Mist. Camph. Arom.

Aromatic Camphor Mixture. Parrish's Camphor Mixture. A mixture of compound tincture of lavender (25) with sugar (3.5) and camphor water (to make 100).

Average dose: 8 mils or 2 fluidrachms.

MISTURA CARMINATIVA, N. F. IV. Mist. Carminat.

Carminative Mixture, Dalby's Carminative. A mixture of magnesium carbonate (6.5) potassium carbonate (0.3), tincture of opium (2.5) with oil of caraway, oil of fennel, oil of peppermint, syrup (16), and water (to make 100).

Average dose: For infants 0.5 mil or 8 minims.

MISTURA CHLORALIS ET POTASSII BROMIDI COMPOSITA, N. F. IV.

Mist. Chloral. et Pot. Brom. Co.

Compound Mixture of Chloral and Bromide, Chloral and Bromide Compound. A mixture of hydrated chloral (20), potassium bromide (20), extract of cannabis (0.2), extract of hyoscyamus (0.2), and water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

MISTURA CHLOROFORMI ET CANNABIS COMPOSITA, N. F. III. See

Mistura Chloroformi et Merphinae, N. F. IV.

MISTURA CHLOROFORMI ET MORPHINA COMPOSITA, N. F. IV. Mist.

Chlorof. et Morph. Co.

Compound Mixture of Chloroform and Morphine, *Mistura Chloroformi et Cannabis Indicae Composita, N. F. III*, Chloroform Anodyne. A mixture of chloroform (12.5), ether (3.25), tincture of cannabis (18.5), tincture of capsicum (2.5), morphine sulphate (0.25), oil of peppermint (0.2), glycerin (12.5), water (6.5), and alcohol (to make 100).

Average dose: 2 mils or 30 minims.

MISTURÆ CONTRADIARRHŒAM, N. F. III.

Diarrhœa Mixtures.

1. Sun Cholera Mixture, Sun Mixture, See *Mistura Opii et Rhei Composita, N. F. IV.*

2. Squibb's Diarrhœa Mixture, See *Mistura Opii et Chloroformi Composita*, N. F. IV.

3. Loomis' Diarrhœa Mixture. Deleted.

4. Thielmann's Diarrhœa Mixture. Deleted.

MISTURA COPAIBÆ, N. F. III.

1. Lafayette Mixture. See *Mistura Copaiba*, N. F. IV.

2. Chapman's Mixture. See *Mistura Copaiba et Opii*, N. F. IV.

MISTURA COPAIBA, N. F. IV.

Mist. Copaib.

Copaiba Mixture, Lafayette Mixture. Contains copaiba (12.5) spirit of nitrous ether (12.5), compound tincture of lavender (12.5), solution of potassium hydroxide (3.2), syrup (30), and mucilage of acacia (to make 100).

Average dose: 8 mils or 2 fluidrachms.

MISTURA COPAIBA ET OPII, N. F. IV.

Mist. Copaib. et Opii.

Mixture of Copaiba and Opium, Chapman's Mixture. Contains copaiba (25), spirit of nitrous ether (25), compound tincture of lavender (6.5), tincture of opium (3.2), mucilage of acacia (12.5), and water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

MISTURA CRETÆ, U. S. P. IX.

Mist. Cret.

Chalk Mixture. A mixture of compound chalk powder (20) with cinnamon water (40) and water (to make 100).

Average dose: 15 mils or 4 fluidrachms.

MISTURA FERRI COMPOSITA, N. F. IV. From U. S. P. VIII.

Mist. Ferr. Co.

Compound Iron Mixture, also known as Compound Mixture of Iron, Griffith's Mixture. Contains ferrous carbonate, made by mixing ferrous sulphate (0.6), myrrh (1.8), sugar (1.8), potassium carbonate (0.8), spirit of lavender (6), and rose water (to make 100). Should be freshly prepared.

Average dose: 15 mils or 4 fluidrachms.

MISTURA GLYCYRRHIZÆ COMPOSITA, U. S. P. IX. Mist. Glycyrrh. Co.

Compound Mixture of Glycyrrhiza, Brown Mixture. Now a mixture of pure extract of glycyrrhiza (3), syrup (5), acacia (3), antimony and potassium tartrate (0.024), camphorated tincture of opium (12), spirit of nitrous ether (3), and water (to make 100).

Average dose: 10 mils or 2½ fluidrachms.

MISTURA GUAIACI, N. F. IV.

Mist. Guaiac.

Mixture of Guaiac. Now contains tincture of guaiac (12.5), clarified honey, (25) and cinnamon water (to make 100).

Average dose: 15 mils or 4 fluidrachms.

MISTURA MAGNESIÆ ASAFETIDÆ ET OPII, N. F. IV.

Mist. Mag. Asafæt. et Opii.

Mixture of Magnesia, Asafetida and Opium, *Mistura Magnesiæ et Asafetidæ*, N. F. III. Dewees' Carminative. Contains magnesium carbonate (5), tincture of asafetida (7.5), tincture of opium (1), sugar (10), and water (to make 100).

Average dose: 8 mils or 2 fluidrachms.

MISTURA MAGNESIÆ ET ASAFETIDÆ, N. F. III. See *Mistura Magnesiæ Asafetidæ et Opii*, N. F. IV.**MISTURA OLEI PICIS, N. F. IV.**

Mist. Ol. Pic.

Mixture of Oil of Tar, *Mistura Picis Liquidæ*, Tar Mixture. Contains pure extract of glycyrrhiza (6.5), oil of tar (3.5), sugar (25), chloroform (1), oil of peppermint (0.3), alcohol (16), and water (to make 100).

Average dose: 8 mils or 2 fluidrachms.

MISTURA OLEO-BALSAMICA, N. F. IV.

Mist. Ol. Balsam.

Oleo-Balsamic Mixture. Now contains oil of lavender (0.4), eugenol (0.4), oil of cinnamon (0.4), oil of thyme (0.4), oil of lemon (0.4), oil of myristica (0.4), balsam of Peru (0.4), and alcohol (to make 100).

MISTURA OPII ET CHLOROFORMI COMPOSITA, N. F. IV.

Mist. Opii et Chlorof. Co.

Compound Mixture of Opium and Chloroform. Squibb's *Diarrhœa Mixture*. Contains tincture of opium (20), spirit of camphor (20), tincture of capsicum (10), chloroform (8), and alcohol (to make 100).

Average dose: 2 mils or 30 minims.

MISTURA OPII ET RHEI COMPOSITA, N. F. IV.

Mist. Opii et Rhei Co.

Compound Mixture of Opium and Rhubarb, *Sun Cholera Mixture*. Contains tincture of capsicum (10), tincture of rhubarb (10), tincture of opium (20), spirit of camphor (20), spirit of peppermint (20), and alcohol (to make 100).

Average dose: 2 mils or 30 minims.

MISTURA OPII ET SASSAFRAS, N. F. IV.

Mist. Opii et Sassaf.

Mixture of Opium and Sassafras, *Mistura Sassafras et Opii*, N. F. III. *Mistura Opii Alkalina*, Godfrey's Cordial. Contains oil of sassafras (0.1), tincture of opium (3.5), alcohol (5), potassium carbonate (0.8), syrup (32.5), and water (to make 100).

Average dose: Infants, 0.3 mil or 5 minims.

MISTURA PECTORALIS, STOKES, N. F. IV.

Mist. Pect. Stokes.

Stokes' Expectorant, Stokes' Mixture. Contains ammonium carbonate (1.75), fluidextract of senega (3.5), fluidextract of squill

(3.5), camphorated tincture of opium (17.5), water (8.5), and syrup of tolu (to make 100).

Average dose: 4 mils or 1 fluidrachm.

MISTURA RHEI ALKALINA, N. F. IV.

Mist. Rhei Alk.

Alkaline Mixture of Rhubarb, Neutralizing Cordial, Syrupus Rhei et Potassii Compositus, N. F. III. Contains fluidextract of rhubarb (1.6), fluidextract of hydrastis (0.8), potassium carbonate (1.6), tincture of cinnamon (6.4), spirit of peppermint (0.8), syrup (25), and alcohol (to make 100).

Average dose: 4 mils or 1 fluidrachm.

MISTURA RHEI COMPOSITA, N. F. III. Deleted.

MISTURA RHEI COMPOSITA, N. F. IV. From U. S. P. VIII.

Mist. Rhei Co.

Compound Mixture of Rhubarb, Mistura Rhei et Sodæ, U. S. P. VIII. Mixture of Rhubarb and Soda. Contains sodium bicarbonate (3.5), fluidextract of rhubarb (1.5), fluidextract of ipecac (0.3), glycerin (35), spirit of peppermint (3.5), and water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

MISTURA RHEI ET SODÆ, U. S. P. VIII. See Mistura Rhei Composita, N. F. IV.

MISTURA SASSAFRAS ET OPII, N. F. III. See Mistura Opii et Sassafras, N. F. IV.

MISTURA SODÆ ET MENTHÆ, N. F. III. See Liquor Sodæ et Menthæ, N. F. IV.

MISTURA SPLENETICA, N. F. III. Deleted.

MISTURA SULPHURICA ACIDA, N. F. III. Deleted.

MORPHINA, U. S. P. IX.

Morphine. An alkaloid $C_{17}H_{19}O_5N + H_2O$, obtained from opium. Tests for identity and purity.

Average dose: 0.008 gm. or $\frac{1}{8}$ grain.

MORPHINÆ ACETAS, U. S. P. VIII. Deleted.

MORPHINÆ HYDROCHLORIDUM, U. S. P. IX.

Morph. Hydrochl.

Morphine Hydrochloride, Morphine Chloride. Official in European pharmacopœias as Morphinum Hydrochloricum (E), Chloretum Morphicum (S). The hydrochloride $C_{17}H_{19}O_5N.HCl + 3H_2O$ of the alkaloid morphine. Tests for identity and purity.

Average dose: 0.008 gm. or $\frac{1}{8}$ grain.

Preparation: N. F.—Syrupus Morphinæ et Acaciæ.

MORPHINÆ SULPHAS, U. S. P. IX.**Morph. Sulph.**

Morphine Sulphate. Official in the Japanese pharmacopœia as *Morphinum Sulfuricum*. The sulphate $(C_{17}H_{19}O_3N)_2 \cdot H_2SO_4 + 5H_2O$ of the alkaloid morphine. Tests for identity and purity.

Average dose: 0.008 gm. or $\frac{1}{4}$ grain.

Preparations: N. F.—*Mistura Chloroformi et Morphinæ Composita* *Syrupus Pini Strobi Compositus Cum Morphina*.

MOSCHUS, U. S. P. IX.**Mosch.**

Musk, Tonquin Musk, Deer Musk. The dried secretion from the preputial follicles of *Moschus moschiferus* Linné. Tests for identity and purity.

Average dose: 0.25 gm. or 4 grains.

Preparation: U. S. P.—*Tinctura Moschi*.

MUCILAGO ACACIÆ, U. S. P. IX.**Mucil. Acac.**

Mucilage of Acacia. Official in European pharmacopœias as *Mucilago Gummi Arabici* (E). A solution of acacia (35) in distilled water (to make 100).

Average dose: 15 mils or 4 fluidrachms.

Preparations: N. F.—*Mistura Copaibæ*, *Mistura Copaibæ et Opil*.

MUCILAGO CHONDRI, N. F. IV.**Mucil. Chondr.**

Mucilage of Chondrus, Mucilage of Irish Moss. Made by heating chondrus (3) with water (to make 100).

MUCILAGO CYDONII, N. F. III. Deleted.**MUCILAGO DEXTRINI, N. F. III. Deleted.****MUCILAGO SALEP, N. F. III. Deleted.****MUCILAGO SASSAFRAS MEDULLÆ, N. F. IV. From U. S. P. VIII.****Mucil. Sassaf. Medul.**

Mucilage of Sassafras Pith. Made by macerating sassafras pith (2) with water (to make 100). Should be freshly prepared.

Average dose: 15 mils or 4 fluidrachms.

MUCILAGO TRAGACANTHÆ, U. S. P. IX.**Mucil. Trag.**

Mucilage of Tragacanth. A mixture of tragacanth (6) glycerin (18), and water (to make 100).

Preparation: N. F.—*Trochisci Menthæ Piperitæ*.

MUCILAGO ULMI, U. S. P. VIII. Deleted.**MULLÆ, N. F. IV.**

Mulls, Salve Mulls, Steatins. A general description. A definition and a method for making.

MULLA ACIDI SALICYLICI, N. F. IV. Mull. Acid. Salicyl.

Salicylic Acid Mull, Unguentum Salicylatum Extensum, N. F. III. A mixture of salicylic acid (10), benzoinated suet (80), and benzoinated lard (to make 100).

MULLA CREOSOTI SALICYLATA, N. F. IV. Mull. Creosot. Salicyl.

Salicylated Creosote Mull, Unguentum Creosoti Salicylatum Extensum, N. F. III. A mixture of salicylic acid (10), creosote (20), yellow wax (5), and benzoinated suet (to make 100).

MULLA HYDRARGYRI CHLORIDI CORROSIVI, N. F. IV.

Mull. Hydrarg. Chlor. Corros.

Corrosive Mercuric Chloride Mull, Unguentum Hydrargyri Chloridi, Corrosivi Extensum, N. F. III. A mixture of corrosive mercuric chloride (0.2), alcohol (6), benzoinated suet (90), and benzoinated lard (to make 100).

MULLA ZINCI, N. F. IV.

Mull. Zinc.

Zinc Mull, Unguentum Zinci Extensum, N. F. III. A mixture of zinc oxide (10), benzoinated suet (70), and benzoinated lard (to make 100).

MYRICA, N. F. IV. Part II.

Myrica.

Bayberry Bark. The dried bark of the root of *Myrica cerifera* Linné without admixture of more than 5 per cent of adhering wood. Yields not more than 6 per cent of ash.

Average dose: 0.5 gm. or 8 grains.

Preparation: N. F.—Pulvis Myricæ Compositus.

MYRISTICA, U. S. P. IX.

Myrist.

Myristica, Nutmeg, official in European pharmacopœias as Semen Myristicæ (E). The ripe seeds of *Myristica fragans*, Houtuyn deprived of the arilli and seed coats. Yields not more than 5 per cent of ash.

Average dose: 0.5 gm. or 8 grains.

Preparations: U. S. P.—Used in making Pulvis Aromaticus, Tinctura Lavandulæ Composita, Tinctura Rhei Aromatica.

N. F.—Acetum Opii, Cordiale Rubi Fructus, Pulvis Cretæ Aromaticus, Pulvis Gambir Compositus, Syrupus Sennæ Aromaticus.

MYRRHA, U. S. P. IX.

Myrrh.

Myrrh, Gum Myrrh. Official in European pharmacopœias as Gummi-resina Myrrha (S). A gum-resin obtained from one or more species of *Commiphora*. Myrrh is not less than 35 per cent soluble in alcohol, and yields not more than 8.5 per cent of ash.

Average dose: 0.5 gm. or 8 grains.

Preparations: U. S. P.—Pilulæ Rhei Compositæ, Tinctura Myrrhæ.

N. F.—Pilulæ Aloes et Myrrhæ, Pilulæ Antiperiodicæ, Pilulæ Antiperiodicæ sine Aloe, Tinctura Aloes et Myrrhæ, Tinctura Antiperiodica, Tinctura Antiperiodica sine Aloe, Tinctura Capsici et Myrrhæ.

NAPHTHALENUM, U. S. P. VIII. Deleted.

NEBULA AROMATICA, N. F. IV. New. Nebul. Arom.

Aromatic Oil Spray. A solution of phenol (0.2), menthol (0.2), thymol (0.1), camphor (0.3), benzoic acid (0.3), eucalyptol (0.2), oil of cinnamon (0.2), oil of clove (0.2), methyl salicylate (0.5), in light liquid petrolatum (to make 100).

NEBULA EUCALYPTOLIS, N. F. IV. New. Nebul. Eucalyptol.

Eucalyptol Spray. A solution of eucalyptol (5) in light liquid petrolatum (to make 100).

NEBULA MENTHOLIS, N. F. IV. New. Nebul. Menthol.

Menthol Spray. A solution of menthol (2) in light liquid petrolatum (to make 100).

NEBULA MENTHOLIS COMPOSITA, N. F. IV. New.

Nebul. Menthol. Co.

Compound Menthol Spray. A solution of menthol (1), camphor (1), methyl salicylate (0.5), eucalyptol (0.2), and oil of cinnamon (0.2) in light liquid petrolatum (to make 100).

NEBULA THYMOLIS, N. F. IV. New. Nebul. Thymol.

Thymol Spray. A solution of thymol (1) in light liquid petrolatum (to make 100).

NITROGENII MONOXIDUM, U. S. P. IX. New. Nitrogen. Monox.

Nitrogen Monoxide, Nitrous Oxide. Nitrogen monoxide gas (N_2O). Tests for identity and purity.

NUX VOMICA, U. S. P. IX. Nux. Vom.

Nux Vomica. Included in the International Protocol as *Strychni Semen* (P. I.). The dried, ripe seeds of *Strychnos Nux-vomica* Linné, yielding not less than 2.5 per cent of the alkaloids of Nux Vomica and not more than 3.5 per cent of ash.

Average dose: 0.06 gm. or 1 grain.

Preparations: U. S. P.—Extractum Nucis Vomicae, Fluidextractum Nucis Vomicae, Tinctura Nucis Vomicae.

OLEA INFUSA, N. F. IV. Ol. Inf.

Infused Oils. Now a mixture of the dried drug (10), alcohol (10), and ammonia water (0.2) with sesame oil (100), warmed on a water bath until the alcohol and ammonia water are dissipated. The resulting preparation is then filtered and carefully preserved.

OLEATUM ACONITINÆ, N. F. IV. Oleat. Aconitin.

Oleate of Aconitine. A solution of aconitine (2) in oleic acid (50) and olive oil (to make 100).

OLEATUM ATROPINÆ, N. F. IV. From U. S. P. VIII.

Oleat. Atrop.

Oleate of Atropine. A solution of Atropine (2) in alcohol (2), oleic acid (50), and olive oil (to make 100).

OLEATUM COCAINÆ, N. F. IV. From U. S. P. VIII. Oleat. Cocain.

Oleate of Cocaine. A solution of cocaine (5) in alcohol (5), oleic acid (50), and olive oil (to make 100).

OLEATUM HYDRARGYRI, U. S. P. IX. Oleat. Hydrarg.

Oleate of Mercury. Made by mixing yellow mercuric oxide (25), alcohol (20), and oleic acid (to make 100).

Preparation: U. S. P.—Used in making Unguentum Hydrargyri.

OLEATUM QUININÆ, N. F. IV. From U. S. P. VIII. Oleat. Quin.

Oleate of Quinine. A solution of quinine (25) in oleic acid (to make 100).

OLEATUM VERATRINÆ, N. F. IV. From U. S. P. VIII.

Oleat. Veratrin.

Oleate of Veratrine. A solution of veratrine (2) in oleic acid (50) and olive oil (to make 100).

OLEATUM ZINCI, N. F. III. Deleted.

OLEORESINA ASPIDII, U. S. P. IX.

Oleores. Aspid.

Oleoresin of Aspidium. Oleoresin of Malefern, Oleoresin of Male Fern. Official in European pharmacopœias as Extractum Filicis (E). Made by extracting aspidium with ether and evaporating the solvent.

Average dose: Caution: Single dose, once a day, 2 gm. or 30 grains.

OLEORESINA CAPSICI, U. S. P. IX.

Oleores. Capsic.

Oleoresin of Capsicum. Made by extracting capsicum with ether and evaporating the solvent.

Average dose: 0.03 gm. or $\frac{1}{2}$ grain.

Preparation: N. F.—Emplastrum Capsici.

OLEORESINA CUBEÆ, U. S. P. IX.

Oleores. Cubeb.

Oleoresin of Cubeb. Official in European pharmacopœias as Extractum Cubebæ (E). Made by extracting cubeb with alcohol and evaporating the solvent.

Average dose: 0.5 gm. or 8 grains.

Preparation: U. S. P.—Trochisci Cubebæ.

OLEORESINA LUPULINI, N. F. IV. From U. S. P. VIII.

Oleores. Lupulin.

Oleoresin of Lupulin. Made by extracting lupulin with ether and evaporating the solvent.

Average dose: 0.2 mil or 3 grains.

OLEORESINA PETROSELINI, U. S. P. IX. New. Oleores. Petrosel.

Oleoresin of Parsley Fruit, Liquid Apiol. Made by extracting parsley fruit with ether and evaporating the solvent.

Average dose: 0.5 mil or 8 minims.

OLEORESINA PIPERIS, U. S. P. IX.

Oleores. Piper.

Oleoresin of Pepper. Made by extracting pepper with ether and evaporating the solvent.

Average dose: 0.03 gm. or $\frac{1}{4}$ grain.

OLEORESINA ZINBIBERIS, U. S. P. IX.

Oleores. Zingib.

Oleoresin of Ginger. Made by extracting ginger with ether and evaporating the solvent.

Average dose: 0.03 gm. or $\frac{1}{4}$ grain.

OLEOSACCHARA, N. F. IV.

Oil-sugars, Elæosacchara. Three per cent mixtures of volatile oil with sugar.

OLEUM ADIPIS, U. S. P. VIII. Deleted.**OLEUM ÆTHEREUM, N. F. IV. From U. S. P. VIII.**

Ol. Æther.

Ethereal Oil. A volatile liquid consisting of equal volumes of heavy oil of wine and ether. Method of making.

OLEUM AMYGDALÆ AMARÆ, U. S. P. IX.

Ol. Amygd. Amar.

Oil of bitter almond, Bitter Almond Oil. Official in European pharmacopœias as *Ætheroleum Amygdalæ Amaræ* (S). A volatile oil obtained by maceration and distillation from the ripe kernels of *Prunus Amygdalus amara* de Candolle and from other kernels containing amygdalin. It yields not less than 85 per cent of benzaldehyde (C_7H_6O) and not less than 2 per cent nor more than 4 per cent of hydrocyanic acid (HCN). The botanical source from which it is derived must be stated on the label.

Average dose: 0.03 mil or $\frac{1}{4}$ minim.

Preparations: U. S. P.—*Aqua Amygdalæ Amaræ*, *Spiritus Amygdalæ, Amaræ*.

N. F.—*Elixir Amygdalæ Compositum*.

OLEUM AMYGDALÆ EXPRESSUM, U. S. P. IX.

Ol. Amygd. Exp.

Expressed Almond Oil, Oil of Sweet Almond. Official in European pharmacopœias as *Oleum Amygdalarum* (E). A fixed oil obtained from the kernels of varieties of *Prunus Amygdalus* Stokes. Specific gravity 0.910 to 0.915. The oil remains clear at -10° . Tests for identity and purity and a method of assay.

Preparations: U. S. P.—*Emulsum Olei Terebinthinæ*, *Unguentum Aquæ Rosæ*.

N. F.—*Emulsum Petrolati*, *Unguentum Veratrinæ*, *Oleum Phosphoratum*.

OLEUM ANISI, U. S. P. IX.

Ol. Anisi.

Oil of Anise, Oil of Star Anise, Anise Oil. Official in European pharmacopœias as *Ætheroleum Anisi* (S). A volatile oil distilled from the ripe fruit of *Pimpinella Anisum* Linné or from the ripe fruit

of *Illicium verum* Hooker filius. The botanical source from which it is derived must be stated on the label. Specific gravity 0.978 to 0.988.

Average dose: 0.2 mil or 3 minims.

Preparations: U. S. P.—Aqua Anisi, Fluidextractum Cascaræ Sagradæ Aromaticum, Spiritus Anisi, Tinctura Opii Camphorata, Spiritus Aurantii Compositus, Syrupus Sarsaparillæ Compositus, Trochisci Glycyrrhizæ et Opii.

N. F.—Elixir Phosphori, Tinctura Pectoralis.

OLEUM AURANTII, U. S. P. IX.

Ol. Aurant.

Oil of Orange, Oleum Aurantii Corticis, U. S. P. VIII, Orange Oil, Oil of Sweet Orange. A volatile oil obtained by expression from the fresh peel of sweet orange, *Citrus Aurantium sinensis* Gallesio, and its varieties. Specific gravity 0.842 to 0.846.

Average dose: 0.2 mil or 3 minims.

Preparations: U. S. P.—Spiritus Aurantii Compositus.

N. F.—Elixir Ferri Pyrophosphatis, Quininæ et Strychninæ, Liquor Ferri Peptonati, Liquor Ferri Peptonati et Mangani, Spiritus Cardamomi Compositus, Spiritus Myrciæ, Spiritus Odoratus, Spiritus Vanillini Compositus, Syrupus Quinidinæ, Trochisci Sulphuris et Potassii Bitartratis.

OLEUM AURANTII AMARI, N. F. IV. Part II. Ol. Aurant. Amar.

Oil of Bitter Orange. A volatile oil obtained by expression from the fresh peel of the bitter orange, *Citrus aurantium amara*, Linné. Tests for identity and purity.

Average dose: 0.2 mil or 3 minims.

Preparation: N. F.—Elixir Aurantii Amari.

OLEUM AURANTII CORTICIS, U. S. P. VIII. See Oleum Aurantii, U. S. P. IX.

OLEUM AURANTII FLORUM, N. F. IV. Part II. Ol. Aurant. Flor.

Oil of Orange Flowers, Oil of Neroli. A volatile oil distilled from the fresh flowers of the bitter orange, *Citrus aurantium amara*, Linné. Tests for identity and purity.

Preparation: N. F.—Spiritus Odoratus.

OLEUM BERGAMOTTÆ, N. F. IV. Part II. Ol. Bergam.

Oil of Bergamot. A volatile oil obtained by expression from the rind of the fresh fruit of *Citrus aurantium bergamia* Wight et Arnott and containing not less than 36 per cent of ester, calculated as linalyl acetate. Tests for identity and purity and a method of assay.

Preparation: N. F.—Spiritus Odoratus.

OLEUM BETULÆ, U. S. P. VIII. See Methylis Salicylas, U. S. P. IX.

OLEUM BETULÆ EMPYREUMATICUM RECTIFICATUM, N. F. IV. Part II. Ol. Bet. Empyr. Rect.

Rectified Empyroligneous Oil of Birch, Rectified Oil of Birch Tar, Oleum Rusci Rectificatum. The empyroligneous oil obtained by the dry distillation of the bark and wood of *Betula alba* Linné. Specific gravity from 0.006 to 0.950 at 25°.

Preparation: N. F.—Unguentum Resorcinolis Compositum.

OLEUM CARBOLATUM, N. F. III. See Oleum Phenolatum, N. F. IV.**OLEUM CADINUM**, U. S. P. IX. Ol. Cadin.

Oil of Cade, Cade Oil, Oil of Juniper Tar, Oleum Juniperi Empyreumaticum. An ampyreumatic oil obtained by the dry distillation of the wood *Juniperus Oxycedrus* Linné. Specific gravity 0.980 to 1.055.

Preparation: N. F.—Linimentum Saponis Mollis Compositum, Petroxolinum Cadini, Petroxolinum Sulphurata Compositum, Unguentum Sulphuris Compositum.

OLEUM CAJUPUTI, U. S. P. IX. Ol. Cajup.

Oil of Cajuput, Cajuput Oil, Oil of Cajeput. A volatile oil distilled from the fresh leaves and twigs of several varieties of *Melaleuca Leucadendron* Linné especially the var. *Cajeputi* Roxburgh and the var. minor Smith. Specific gravity 0.912 to 0.925 at 25°.

Average dose: 0.5 mil or 8 minims.

Preparation: N. F.—Linimentum Tiglii.

OLEUM CARBOLATUM, N. F. III. See Oleum Phenolatum, N. F.**OLEUM CARDAMOMI**, N. F. IV. Part II. Ol. Cardam.

Oil of Cardamom. A volatile oil distilled from the seeds of *Elettaria cardamomum* White et Maton. Tests for identity and purity.

Preparations: N. F.—Spiritus Cardamomi Compositus, Spiritus Vanillini Compositus.

OLEUM CARI, U. S. P. IX. Ol. Cari.

Oil of Caraway, Caraway Oil. Official in European pharmacopœias as Oleum Carvi (E), Ætheroleum Carvi (S). A volatile oil distilled from the fruit of *Carum Carvi* Linné and yielding not less than 50 per cent by volume of carvone. Specific gravity 0.900 to 0.910 at 25°. Tests for identity and purity.

Average dose: 0.2 mil or 3 minims.

Preparations: U. S. P.—Spiritus Juniperi Compositus.

N. F.—Mistura Carminativa, Pilulæ Aloes Hydrargyri et Scammonii Compositæ, Spiritus Cardamomi Compositus.

OLEUM CARYOPHYLLI, U. S. P. IX. Ol. Caryoph.

Oil of Clove, Clove oil, Oil of Cloves. A volatile oil distilled from the flower-buds of *Eugenia Aromatica* O. Kuntze, *Jambosa Caryophyllus*

Niedenzu and yielding not less than 82 per cent by volume of eugenol. Specific gravity 1.038 to 1.060 at 25°. Tests for identity and purity and a method of assay.

Average dose: 0.2 mil or 3 minims.

Preparations: N. F.—Acetum Aromaticum, Elixir Glycyrrhizæ Aromaticum, Fluidglyceratum Cascaræ Sagradæ Aromaticum, Liquor Pepsini Aromaticus, Nebula Aromatica, Oleum Ricini Aromaticum, Pilulæ Colocynthis Compositæ, Pilulæ Colocynthis et Hysocyami, Syrupus Eriodictyi Aromaticus, Tinctura Kino et Opii Composita.

OLEUM CASSIÆ, U. S. P. IX.

Ol. Cass.

Oil of Cinnamon, Cassia Oil, Oleum Cinnamomi U. S. P. VIII. A volatile oil distilled from *Cinnamomum Cassia* Blume. Yields not less than 80 per cent by volume of cinnamic aldehyde, C_9H_8O . Tests for identity and purity and a method of assay.

Average dose: 0.2 mil or 3 minims.

Preparations: U. S. P.—Aqua Cinnamomi, Fluidglyceratum Cascaræ Sagradæ Aromaticum, Spiritus Cinnamomi. Used in making Acidum Sulphuricum Aromaticum.

N. F.—Acetum Aromaticum, Elixir Glycyrrhizæ Aromaticum, Liquor Pepsini Aromaticus, Mistura Oleo-Balsamica, Fluidglyceratum Cascaræ Sagradæ Aromaticum, Nebula Aromaticum, Nebula Mentholi Composita, Oleum Ricini Aromaticum, Spiritus Cardamomi Compositus, Spiritus Vanillini Compositus, Syrupus Rhamni Cathartici, Trochisci Gambir.

OLEUM CHENOPODII, U. S. P. IX.

Ol. Chenopod.

Oil of Chenopodium, Oil of American Wormseed. A volatile oil distilled from *Chenopodium ambrosioides anthelminticum* Linné. Specific gravity 0.955 to 0.980 at 25°.

Average dose: 0.2 mil or 3 minims.

OLEUM CINNAMOMI, U. S. P. VIII. See Oleum Cassiæ, U. S. P. IX.

OLEUM COPAIBÆ, U. S. P. VIII. Deleted.

OLEUM CORIANDEI, U. S. P. IX.

Ol. Coriand.

Oil of Coriander, Coriander Oil. A volatile oil distilled from the ripe fruit of *Coriander Sativum* Linné. Specific gravity 0.863 to 0.875.

Average dose: 0.2 mil or 3 minims.

Preparations: U. S. P.—Fluidextractum Cascaræ Sagradæ Aromaticum, Syrupus Sennæ, Spiritus Aurantii Compositus.

N. F.—Confectio Sennæ.

OLEUM CUBEÆ, U. S. P. IX.

Ol. Cubeb.

Oil of Cubeb, Cubeb Oil. A volatile oil distilled from the unripe fruit of *Piper Cubea* Linné filius. Specific gravity from 0.905 to 0.925.

Average dose: 0.5 mil or 8 minims.

OLEUM ERIGERONTIS, U. S. P. VIII. Deleted.

OLEUM EUCALYPTI, U. S. P. IX.

Ol. Eucalypt.

Oil of Eucalyptus, Eucalyptus Oil. A volatile oil distilled from the fresh leaves of *Eucalyptus Globulus* Labillardière or from some other species of *Eucalyptus* and yielding not less than 70 per cent by volume of eucalyptol (cineol) $C_{10}H_{18}O$.

Average dose: 0.5 mil or 8 minims.

OLEUM FŒNICULI, U. S. P. IX.

Ol. Fœnic.

Oil of Fennel, Fennel Oil. Official in European pharmacopœias as Oleum Fœniculi (S). A volatile oil distilled from the ripe fruit collected from cultivated varieties of *Fœniculum vulgare* Miller. Tests for identity and purity. Congealing point does not fall below 3°.

Average dose: 0.2 mil or 3 minims.

Preparations: U. S. P.—Aqua Fœniculi, Pulvis Glycyrrhizæ Compositus, Spiritus Juniperi Compositus.

N. F.—Elixir Anisi, Elixir Glycyrrhizæ Aromaticum, Fluidglyceratum Cascaræ Sagradæ Aromaticum, Mistura Carminativa, Pilulæ ad Prandium, Chapman's, Syrupus Ficorum Compositus, Syrupus Rhamnus Catharticæ.

OLEUM GAULTHERIÆ, U. S. P. VIII. See Methylis Salicylas, U. S. P. IX.

OLEUM GOSSYPI SEMINIS, U. S. P. IX.

Ol. Gossyp. Sem.

Cottonseed Oil. A fixed oil obtained from seeds of cultivated varieties of *Gossypium herbaceum* Linné or of other species of *Gossypium*. Tests for identity and purity.

Preparations: U. S. P.—Linimentum Camphoræ.

N. F.—Unguentum Picis Compositum. Used in making Sapo Mollis.

OLEUM HEDEOMÆ, U. S. P. VIII. Deleted.

OLEUM HYOSCYAMI COMPOSITUM, N. F. IV.

Ol. Hyoscy. Co.

Compound Oil of Hyoscyamus, Balsamum Tranquillans, Tranquille Balsam. A mixture of oil of lavender (2), oil of peppermint (2), oil of rosemary (2), and oil of thyme (2) with infused oil of hyoscyamus (to make 100).

OLEUM JUNIPERI, U. S. P. IX.

Ol. Junip.

Oil of Juniper, Juniper Oil, Oil of Juniper Berries. Official in European pharmacopœias as Ætheroleum Juniperi (S). A volatile oil distilled from the ripe fruit of *Juniperus communis* Linné. Tests for identity and purity.

Average dose: 0.2 mil or 3 minims.

Preparations: U. S. P.—Spiritus Juniperi, Spiritus Juniperi Compositus.

N. F.—Acetum Aromaticum.

OLEUM LAVANDULÆ, U. S. P. IX.

Ol. Lavand.

Oil of Lavender, Oleum Lavendulæ Florum U. S. P. VIII. Official in European pharmacopœias as *Ætheroleum Lavandulæ* (S). A volatile oil distilled from fresh flowering tops of *Lavandula vera* De Candolle. Tests for identity and purity.

Average dose: 0.2 mil or 3 minims.

Preparations: U. S. P.—Linimentum Saponis Mollis, Spiritus Ammoniaë Aromaticus, Spiritus Lavandulæ, Tinctura Lavandulæ Composita, Unguentum Diachylon.

N. F.—Acetum Aromaticum, Linimentum Ammonii Iodidi, Mistura Oleo-Balsamica, Oleum Hyoscyami Compositum, Petroxolinum Iodi, Petroxolinum Liquidum, Petroxolinum Spissum, Spiritus Odoratus.

OLEUM LAVANDULÆ FLORUM, U. S. P. VIII. See Oleum Lavandulæ, U. S. P. IX.

OLEUM LIMONIS, U. S. P. IX.

Ol. Limon.

Oil of Lemon, Lemon Oil. Official in European pharmacopœias as *Ætheroleum Citri* (S). A volatile oil obtained by expression from the fresh peel of the ripe fruit of *Citrus medica Limonum* Hooker filius and yielding not less than 4 per cent of the aldehydes from oil of lemon calculated as citral, $C_{10}H_{16}O$. Tests for identity and purity and a method of assay.

Average dose: 0.2 mil or 3 minims.

Preparations: U. S. P.—Spiritus Ammoniaë Aromaticus, Spiritus Aurantii Compositus.

N. F.—Acetum Aromaticum, Linimentum Terebinthinæ Aceticum, Mistura Oleo-Balsamica, Spiritus Odoratus, Syrupus Eriodictyi Aromaticus, Syrupus Sennæ Aromaticus.

OLEUM LINI, U. S. P. IX.

Ol. Lini.

Linseed Oil, Oil of Flaxseed, Raw Linseed Oil. A fixed oil obtained from linseed. Tests for identity and purity.

Average dose: 30 mils or 1 fluidounce.

Preparations: U. S. P.—Linimentum Calcis, Liquor Cresolis Compositus.

N. F.—Ceratum Resinæ Compositum, Pasta Zinci Mollis, Petroxolinum Sulphurata.

OLEUM MENTHÆ PIPERITÆ, U. S. P. IX.

Ol. Menth. Pip.

Oil of Peppermint, Peppermint Oil. Official in European pharmacopœias as *Ætheroleum Menthæ Piperitæ* (S). A volatile oil distilled from the flowering plant of *Mentha piperita* Linné, rectified by steam distillation and yielding not less than 5 per cent of esters, calculated as menthyl acetate, $C_{10}H_{16}C_2H_5O_2$, and not less than 50 per cent

of total menthol ($C_{10}H_{18}OH$), free and as esters. Tests for identity and purity and a method of assay.

Average dose: 0.2 mil or 3 minims.

Preparations: U. S. P.—Aqua Menthæ Piperitæ, Pilulæ Rhei Compositæ, Spiritus Menthæ Piperitæ.

N. F.—Acetum Aromaticum Cataplasma Kaolini, Gargarisma Guaica Composita, Linimentum Opii Compositum, Liquor Antisepticus Alkalinus. Liquor Pepsini Aromaticus, Mistura Carminativa, Mistura Chloroformi et Morphinæ Composita, Mistura Olei Picis, Oleum Hyoscyami Compositum, Pilulæ Catharticæ Vegetabiles, Trochisci Menthæ Piperitæ.

OLEUM MENTHÆ VIRIDIS, U. S. P. IX.

Ol. Menth. Vir.

Oil of Spearmint, Spearmint Oil. A volatile oil distilled from the flowering plant of *Mentha spicata* Linné and yielding not less than 43 per cent by volume of carvone, $C_{10}H_{14}O$. Tests for identity and purity and a method of assay.

Average dose: 0.2 mil or 3 minims.

Preparations: U. S. P.—Aqua Menthæ Viridis (which see) Spiritus Menthæ Viridis.

OLEUM MORRHUÆ, U. S. P. IX.

Ol. Morrh.

Cod Liver Oil. Official in European pharmacopœias as Oleum Jecoris Aselli (E). A fixed oil obtained from the fresh livers of *Gadus Morrhua* Linné and of other species of *Gadus*. Tests for identity and purity.

Average dose: 10 mils or $2\frac{1}{2}$ fluidrachms.

Preparations: U. S. P.—Emulsum Olei Morrhuæ.

N. F.—Emulsum Olei Morrhuæ cum Calcii Lactophosphate, Emulsum Olei Morrhuæ cum Calcii Phosphate, Emulsum Olei Morrhuæ cum Hypophosphitibus, Emulsum Olei Morrhuæ cum Malto, Emulsum Olei Morrhuæ cum Pruno Virginiana, Emulsum Olei Morrhuæ cum Vitello.

OLEUM MYRCIÆ, N. F. IV. Part II.

Ol. Myrc.

Oil of Myrcia, Oil of Bay. A volatile oil distilled from the leaves of *Pimenta acris* Wight. Tests for identity and purity.

Preparation: N. F.—Spiritus Myrciæ Compositus.

OLEUM MYRISTICÆ, U. S. P. IX.

Ol. Myrist.

Oil of Myristica, Myristica Oil, Oil of Nutmeg. A volatile oil distilled from the kernel of the ripe seed of *Myristica fragrans* Houttuyn. Tests for identity and purity.

Average dose: 0.2 mil or 3 minims.

Preparations: U. S. P.—Spiritus Ammonia Aromaticus.

N. F.—Elixir Glycyrrhizæ Aromaticum, Elixir Pepsini et Rennini Compositum, Mistura Oleo-Balsamica.

OLEUM OLIVÆ, U. S. P. IX.

Ol. Oliv.

Olive Oil. Official in European pharmacopœias as *Oleum Olivæ* (E). A fixed oil obtained from the ripe fruit of *Oleo europæa* Linné.

Average dose: 30 mils or 1 fluidounce.

Preparations: U. S. P.—Unguentum Diachylon.

N. F.—Emplastrum Fuscum Camphoratum, Linimentum Tiglli Compositum, Oleatum Aconitinæ, Oleatum Atropinæ, Oleatum Cocainæ, Oleatum Veratrinæ, Oleum Phenolatum, Unguentum Fuscum.

OLEUM PHENOLATUM, N. F. IV.

Ol. Phenol.

Phenolated Oil, Oleum Carbolatum, N. F. III. Carbolized Oil. A solution of phenol (5) in olive oil (to make 100).

OLEUM PHOSPHORATUM, N. F. IV.

Ol. Phosphorat.

Phosphorated Oil. A solution of Phosphorus (1) in ether mixed with expressed oil of almond (to make 100).

Average dose: 0.05 mil or 1 minim.

OLEUM PICIS LIQUIDÆ, U. S. P. VIII. See Oleum Picis Liquidæ Rectificatum, U. S. P. IX.

OLEUM PICIS LIQUIDÆ RECTIFICATUM, U. S. P. IX. Ol. Pic. Liq. Rect.

Rectified Oil of Tar, Rectified Tar Oil. A rectified volatile oil distilled from tar. Tests for identity.

Average dose: 0.2 mil or 3 minims.

Preparations: N. F.—Mistura Olei Picis, Petroxolinum Picis, Unguentum Picis Compositum.

OLEUM PIMENTÆ, U. S. P. IX.

Ol. Piment.

Oil of Pimenta, Pimento Oil, Oil of Allspice. A volatile oil distilled from the fruit of *Pimenta officinalis* Lindley yielding not less than 65 per cent by volume of eugenol, $C_{10}H_{12}O_2$. Tests for identity and purity and a method of assay.

Average dose: 0.2 mil or 3 minims.

Preparation: N. F.—Spiritus Myrciæ.

OLEUM PINI PUMILIONIS, U. S. P. IX. New.

Ol. Pin. Pumil.

Oil of Dwarf Pine Needles. Dwarf Pine Oil. A volatile oil distilled from the fresh leaves of *Pinus montana* Miller. Tests for identity and purity.

OLEUM RICINI, U. S. P. IX.

Ol. Ricin.

Castor Oil. A fixed oil obtained from the seeds of *Ricinus communis* Linné. Tests for identity and purity.

Average dose: 15 mils or 4 fluidrachms.

Preparations: U. S. P.—Collodium Flexile.

N. F.—Emulsum Olei Ricini, Linimentum Sinapis Compositum, Oleum Ricini Aromaticum, Pilulæ Antimonii Compositæ.

OLEUM RICINI AROMATICUM, N. F. IV. New. **Ol. Ricin. Arom.**

Aromatic Castor Oil. A mixture of benzosulphinide (0.05), oil of cinnamon (0.3), oil of clove (0.1), vanillin (0.1), coumarin (0.01), alcohol (3), and castor oil (to make 100).

Average dose: 15 mils or 4 fluidrachms.

OLEUM ROSÆ, U. S. P. VIII. Deleted.

OLEUM ROSMARINI, U. S. P. IX. **Ol. Rosmar.**

Oil of Rosemary, Rosemary Oil. Official in European pharmacopœias as *Ætheroleum Rosmarini* (S). A volatile oil distilled from the fresh flowering tops of *Rosmarinus officinalis* Linné, yielding not less than 2.5 per cent of ester, calculated as bornyl acetate, ($C_{10}H_{17}C_2H_3O_2$) and not less than 10 per cent of total borneol ($C_{10}H_{17}OH$).

Average dose: 0.2 mil or 3 minims.

Preparations: U. S. P.—*Linimentum Saponis*, *Tinctura Lavandulæ Composita*.

N. F.—*Acetum Aromaticum*, *Linimentum Ammonii Iodidi*, *Linimentum Saponato-Camphoratum*, *Oleum Hyoscyami Compositum*, *Spiritus Odoratus*.

OLEUM SABINÆ, U. S. P. VIII. Deleted.

OLEUM SANTALI, U. S. P. IX. **Ol. Santal.**

Oil of Santal, Santalwood Oil, Oil of Sandalwood. A volatile oil distilled from the wood of *Santalum album* Linné yielding not less than 90 per cent of alcohols, calculated as santalol. Tests for identity and purity and a method of assay.

Average dose: 0.5 mil or 8 minims.

OLEUM SASSAFRAS, U. S. P. IX. **Ol. Sassaf.**

Oil of Sassafras, Sassafras Oil. A volatile oil distilled from the root of *Sassafras variifolium* O. Kuntze. Tests for identity and purity.

Average dose: 0.2 mil or 3 minims.

Preparations: U. S. P.—*Syrupus Sarsaparillæ Compositus*, *Trochisci Cubebæ*.

N. F.—*Linimentum Tiglii Compositum*, *Mistura Opii et Sassafras Morphinæ et Acaciæ*, *Syrupus Pini Strobi Compositus*, *Syrupus Pini Strobi Compositus cum Morphina*.

OLEUM SESAMI, U. S. P. IX. New. **Ol. Sesam.**

Sesame Oil, Teel Oil, Benne Oil. A fixed oil obtained from the seeds of one or more cultivated varieties of *Sesamum indicum* Linné. Tests for identity and purity.

Preparations: N. F.—*Olea Infusa*.

OLEUM SINAPIS VOLATILE, U. S. P. IX. **Ol. Sinap. Vol.**

Volatile oil of Mustard, Mustard Oil. Official in European pharmacopœias as *Oleum Sinapis Æthereum* (E). A volatile oil pro-

duced synthetically or obtained from the seed of *Brassica nigra* Koch by maceration with water and subsequent distillation. Yields not less than 92 per cent of allyl isothiocyanate (C_3H_5SCN). Tests for identity and purity and a method of assay.

Average dose: 0.008 mil or $\frac{1}{8}$ minim.

Preparations: N. F.—Linimentum Sinapis Compositum, Spiritus Sinapis.

OLEUM TEREBINTHINÆ, U. S. P. IX. Ol. Tereb.

Oil of Turpentine, Turpentine Oil, "Spirits of Turpentine." Official in European pharmacopœias as *Ætheroleum Terebinthinæ Crudum* (S). The volatile oil distilled with water, from the concrete oleoresin obtained from *Pinus palustris* Miller or from other species of *Pinus*. Tests for identity and purity.

Preparations: U. S. P.—Ceratum Cantharidis, Linimentum Terebinthinæ, Oleum Terebinthinæ Rectificatum.

N. F.—Linimentum Opii Compositum, Linimentum Terebinthinæ Aceticum, Linimentum Tiglli Compositum, Petroxolinum, Sulphurata Composita.

OLEUM TEREBINTHINÆ RECTIFICATUM, U. S. P. IX. Ol. Tereb. Rect.

Rectified Oil of Turpentine, Rectified Turpentine Oil. Official in European pharmacopœias as *Ætheroleum Terebinthinæ Rectificatum* (S). Oil of Turpentine rectified by shaking with solution of sodium hydroxide and distilling the mixture.

Average dose: 0.3 mil or 5 minims.

Preparation: U. S. P.—Emulsum Olei Terebinthinæ.

OLEUM THEOBROMATIS, U. S. P. IX. Ol. Theobrom.

Oil of Theobroma, Butter of Cacao, Cacao Butter. Official in European pharmacopœias as *Oleum Cacao* (E). A concrete, fixed oil obtained from the roasted seeds of *Theobroma Cacao* Linné. Tests for identity and purity.

Preparations: U. S. P.—Used in making suppositoria.

N. F.—Trochisci Quininæ Tannatis.

OLEUM THYMI, U. S. P. IX. Ol. Thymi.

Oil of Thyme, Thyme Oil. Official in European pharmacopœias as *Ætheroleum Thymi* (S). A volatile oil distilled from the flowering plant of *Thymus vulgaris* Linné. Contains not less than 20 per cent, by volume, of phenols.

Average dose: 0.2 mil or 3 minims.

Preparations: N. F.—Linimentum Saponato-Camphoratum, Liquor Antisepticus, Liquor Zinci et Alumini Compositus, Liquor Zinci et Ferri Compositus, Mistura Oleo-Balsamica, Oleum Hyoscyamus Compositum.

OLEUM TIGLII, U. S. P. IX.

Ol. Tiglii.

Croton Oil. Official in European pharmacopœias as Oleum Crotonis (E). A fixed oil expressed from the seeds of *Croton Tiglium* Linné. Tests for identity and purity.

Average dose: 0.05 mil or 1 minim.

Preparations: N. F.—Collodium Tiglii, Linimentum Tiglii, Linimentum Tiglii Compositum, Pilulæ Aloes Hydrargyri et Scammonii Compositæ.

OPII PULVIS, U. S. P. IX.

Opii Pulv.

Powdered Opium, Included in the International Protocol as Pulvis Opii (P. I.). Opium dried at a temperature not exceeding 70° reduced to a very low powder and yielding from 10 to 10.5 per cent of anhydrous morphine. Method of assay.

Average dose: 0.06 gm. or 1 grain.

Preparations: U. S. P.—Pulvis Ipecacuanhæ et Opii, Tinctura Opii Camphorata, Trochisci Glycyrrhizæ et Opii.

N. F.—Acetum Opii, Pilulæ Opii, Digitalis et Quininæ, Pilulæ Opii et Camphoræ, Pilulæ Opii et Plumbi, Pulvis Cretæ Aromaticus cum Opio, Pulvis Kino et Opii Compositus.

OPIUM, U. S. P. IX.

Opium. The air-dried, milky exudation obtained from the unripe capsules of *Papaver somniferum* Linné. Yields not less than 9.5 per cent of anhydrous morphine. Method of assay.

Average dose: 0.06 gm. or 1 grain.

Preparations: U. S. P.—Extractum Opii, Opii Pulvis (which see), Opium Deodoratum, Opium Granulatum (which see).

OPIUM DEODORATUM, U. S. P. IX.

Opium Deod.

Deodorized Opium. Powdered opium deodorized by extraction with purified petroleum benzin. Yields from 10 to 10.5 per cent of anhydrous morphine. Method of assay.

Average dose: 0.06 gm. or 1 grain.

OPIUM GRANULATUM, U. S. P. IX.

Opium Gran.

Granulated Opium. Opium dried at not exceeding 70° and granulated yields from 10 to 10.5 per cent of anhydrous morphine. Method of assay.

Average dose: 0.06 gm. or 1 grain.

Preparations: U. S. P.—Tinctura Opii (which see), Tinctura Opii Deodorati.

N. F.—Tinctura Opii Crocata.

OVI ALBUMEN RECENS. N. F. IV. Part II.

Ovi Album.

Fresh Egg Albumen. The freshly separated liquid white of recently laid eggs of the hen *Gallus domesticus* Temminck.

Preparations: N. F.—Linimentum Opii Compositum, Liquor Ferri Albuminati; Used in making Liquor Ferri Peptonati, Liquor Ferri Peptonati et Mangani.

OVI VITELLUM RECENS, N. F. IV. Part II. Ovi Vitel.

Fresh Egg Yolk. The freshly separated yolk of recently laid eggs of the hen, *Gallus domesticus* Temminck.

Preparations: N. F.—Glyceritum Vitelli (which see), Linimentum Terebinthinæ Aceticum.

OVUM GALLINACEUM, N. F. IV. Part II. Ovum Gallin.

Fresh Egg, Hen's Egg. The recently laid egg of the hen *Gallus domesticus* Temminck.

Preparation: N. F.—Linimentum Terebinthinæ Aceticum.

OXYGENIUM, U. S. P. IX. New. Oxygen.

Oxygen. Contains not less than 95 per cent, by volume, of O. Tests for identity and purity and a method of assay.

OXYMEL SCILLÆ, N. F. IV. Oxymel. Scill.

Oxymel of Squill. A mixture of the extractive, in vinegar, of squill (50) with clarified honey (to make 100).

Average dose: 4 mils or 1 fluidrachm.

PANCREATINUM, U. S. P. IX. Pancreat.

Pancreatin. A mixture of enzymes, consisting principally of amylopsin, trypsin and steapsin, naturally existing in the pancreas of warm-blooded animals, obtained from the fresh pancreas of the hog *Sus scrofa* var. *domesticus* Gray, or of the ox *Bos taurus* Linné. Converts not less than 25 times its own weight of starch into sugars.

Average dose: 0.5 gm. or 8 grains.

Preparations: N. F.—Liquor Pancreatini, Pulvis Pancreatini Compositus.

PAPAVERIS FRUCTUS, N. F. IV. Part II. Papav. Fruct.

Poppy Capsules. The dried, fully grown, unripe fruit of *Papaver somniferum* Linné. In making pharmaceutical preparations the seeds are to be rejected.

Average dose: 1 gm. or 15 grains.

Preparation: N. F.—Syrupus Papaveris.

PARACOTO, N. F. IV. Part II. Paracot.

Paracoto. The dried bark of an unidentified tree indigenous to Northern Bolivia. Yields not more than 3 per cent of ash.

Average dose: 0.3 gm. or 5 grains.

Preparations: N. F.—Fluidextractum Paracoto, Tinctura Paracoto.

PARAFFINUM, U. S. P. IX.**Paraff.**

Paraffin. Official in European pharmacopœias as Paraffinum Sodium (E). A purified mixture of solid hydrocarbons. Tests for identity and purity.

Preparations: U. S. P.—Unguentum Acidi Borici.

N. F.—Ceratum Plumbi Subacetatis.

PARAFORMALDEHYDUM, U. S. P. IX. New.**Paraform.**

Paraformaldehyde, Paraform. Official in European pharmacopœias as Trioxymethylenum (E). Contains not less than 95 per cent of $(\text{HCHO})_3$, a polymeric form of formaldehyde. Tests for identity and purity and a method of assay.

Average dose: 0.5 gm. or 8 grains.

PARALDEHYDUM, U. S. P. IX.**Paraldehyd.**

Paraldehyde. A polymer $(\text{CH}_3\text{CHO})_3$ of acetaldehyde. Tests for identity and purity.

Average dose: 2 mls or 30 minims.

PAREIRA, N. F. IV. Part II. From U. S. P. VIII.**Pareir.**

Pareira, Pareira Brava. The dried roots of *Chondrodendron tomentosum* Ruiz et Pavon without admixture of more than 5 per cent of stems and other foreign matter.

Average dose: 2 gm. or 30 grains.

Preparation: N. F.—Fluidextractum Pareiræ.

PASSIFLORA, N. F. IV. Part II.**Passiflor.**

Passion Flower, Passion Vine. The dried herbage of *Passiflora incarnata* Linné collected after some of the berries have matured. Yields not more than 12 per cent of ash.

Average dose: 0.2 gm. or 3 grains.

Preparation: N. F.—Tinctura Passifloræ.

PASTÆ DERMATOLOGICÆ, N. F. IV.

Dermatologic Pastes. Ointment like medicaments for external use.

PASTA BETANAPHTHOLIS, N. F. IV.**Past. Betanaphthol.**

Betanaphthol Paste, Lassar's Naphthol Paste. A mixture of betanaphthol (10), precipitated sulphur (50), petrolatum (20), and soft soap (to make 100).

PASTA DEXTRINATA, N. F. IV.**Past. Dextrin.**

Dextrinated Paste. A mixture of white dextrin (33), glycerin (33), and water (to make 100).

PASTA ICHTHYOLI, Unna, N. F. III. Deleted.**PASTA NAPHTHOLI, Lassar, N. F. III. See Pasta Betanaphtholis, N. F. IV.**

PASTA RESORCINI MITIS, Lassar, N. F. III. See Pasta Resorcinolis Mitis, N. F. IV.

PASTA RESORCINOLIS FORTIS, N. F. IV. Past. Resorcin. Fort.

Strong Resorcinol Paste, Lassar's Stronger Resorcinol Paste. A mixture of resorcinol (20), zinc oxide (20), starch (20), and heavy liquid petrolatum (to make 100).

PASTA RESORCINOLIS MITIS, N. F. IV. Past. Resorcin. Mit.

Mild Resorcinol Paste. A mixture of resorcinol (10), zinc oxide (25), starch (25), and heavy liquid petrolatum (to make 100).

PASTA ZINCI, N. F. IV. Past. Zinc.

Zinc Paste, Lassar's Zinc Paste. A mixture of salicylic acid (2), zinc oxide (24), starch (24), and petrolatum (to make 100).

PASTA ZINCI, Lassar, N. F. III. See Pasta Zinci, N. F. IV.

PASTA ZINCI MOLLIS, N. F. IV. Past. Zinc. Moll.

Soft Zinc Paste, Unna's Soft Zinc Paste. A mixture of zinc oxide (25), precipitated calcium carbonate (25), linseed oil (25), and solution of calcium hydroxide (to make 100).

PASTA ZINCI MOLLIS, Unna, N. F. III. See Pasta Zinci Mollis, N. F. IV.

PASTA ZINCI SULPHURATA, N. F. IV. Past. Zinc. Sulphur.

Sulphurated Zinc Paste, Unna's Sulphurated Zinc Paste. A mixture of zinc oxide (15), precipitated sulphur (10), purified silicious earth (5), and benzoinated lard (to make 100).

PASTA ZINCI SULPHURATA, N. F. III. See Pasta Zinci Sulphurata, N. F. IV.

PELLETIERINÆ TANNAS, U. S. P. IX. Pellet. Tann.

Pelletierine Tannate. A mixture of the tannates of four alkaloids (punicine, iso-punicine, methyl-punicine, and pseudopunicine) obtained from pomegranate. Tests for identity and purity.

Average dose: 0.25 gm. or 4 grains.

PEPO, U. S. P. IX. Pepo

Pepo, Pumpkin Seed. The dried ripe seeds of cultivated varieties of *Cucurbita Pepo* without admixture of more than 5 per cent of other substances.

Average dose: 30 gm. or 1 ounce.

PEPSINUM, U. S. P. IX. Pepsin.

Pepsin. Contains a proteolytic enzyme, obtained from the glandular layer of the fresh stomach of the hog *Sus scrofa*, var. *domesticus* Gray. Digests not less than 3,000 times its own weight of freshly coagulated and disintegrated egg albumen. Tests for identity and purity and a method of assay.

Average dose: 0.5 gm. or 8 grains.

Preparations: N. F.—Elixir Pepsini et Bismuthi, Elixir Pepsini et Rennini Compositum, Glyceritum Pepsini (which see), Liquor Pepsini Antisepticus, Liquor Pepsini Aromaticus, Pepsinum Saccharatum. Used in making Liquor Ferri Peptonati, Liquor Ferri Peptonati cum Mangano.

PEPSINUM AROMATICUM, N. F. III. Deleted.

PEPSINUM SACCHARATUM, N. F. IV.

Pepsin. Sacchar.

Saccharated Pepsin. A mixture of pepsin (10) and sugar of milk (to make 100).

Average dose: 1 gm. or 15 grains.

PERSIO, N. F. IV.

Persio.

Cudbear, Red Indigo. A purplish-red powder prepared from species of *Roccella*, *Lecanora*, or other lichens. Yields not more than 35 per cent of ash, consisting mainly of sodium chloride.

Preparations: N. F.—Tinctura Persionis, Tinctura Persionis Composita. Used in coloring Elixir Aromaticum Rubrum, Elixir Trium Bromidorum, Liquor Antisepticus Alkalinus, Syrupus Pini Strobi Compositus, Syrupus Pini Strobi Compositus cum Morphina.

PETROLATUM, U. S. P. IX.

Petrolat.

Petrolatum, Petrolatum Ointment, Petroleum Jelly; also sold as Vaseline. Official in European pharmacopœias as Vaselinum (E). A purified mixture of semi-solid hydrocarbons. Tests for identity and purity.

Preparations: U. S. P.—Unguentum Hydrargyri Dilutum, Unguentum Hydrargyri Oxidi Flavi, Unguentum Hydrargyri Oxidi Rubri.

N. F.—Emulsum Petrolati, Pasta Betanaphtholis, Pasta Zinci, Unguentum Hydrargyri Oxidi Rubri, Unguentum Resorcinolis Compositum.

PETROLATUM ALBUM, U. S. P. IX.

Petrolat. Alb.

White Petrolatum, White Petroleum Jelly; also sold as White Vaseline. Official in European pharmacopœias as Vaslinum Album (E). Petrolatum decolorized or nearly so.

Preparations: U. S. P.—Ceratum, Ceratum Camphoræ, Unguentum Acidi Borici, Unguentum Hydrargyri Ammoniati, Unguentum Phenolis.

N. F.—Ceratum Plumbi Subacetatis, Unguentum Zinci Stearatis.

PETROLATUM LIQUIDUM, U. S. P. IX.

Petrolat. Liq.

Liquid Petrolatum, Liquid Paraffin, Mineral Oil. Official in European pharmacopœias as Paraffinum Liquidum (S). A mixture of liquid hydrocarbons. Official in two forms: Heavy Liquid Petrolatum has a viscosity of not less than 3.1 and Light Liquid Petrolatum

has a viscosity of not more than 3. Specific gravity 0.828 to 0.905 at 25°. Tests for identity and purity.

Average dose: 15 mils or 4 fluid drachms.

Preparation: U. S. P.—Ceratum Cantharidis.

N. F.—Nebulæ, Pasta Resorcinolis Fortis, Pasta Resorcinolis Mitis, Petroxolinum Liquidum (which see), Petroxolinum Spissum (which see).

PETROLATUM SAPONATUM LIQUIDUM, N. F. III. See Petroxolinum Liquidum, N. F. IV.

PETROLATUM SAPONATUM SPISSUM, N. F. III. See Petroxolinum Spissum, N. F. IV.

PETROSELINI RADIX, N. F. IV. Part II. Petrosel. Rad.

Parsley Root. The root of *Petroselinum sativum* Hoffmann. Yields not more than 6 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparation: N. F.—Fluidextractum Petroselini Radicis.

PETROSELINUM, U. S. P. IX. New. Petrosel.

Parsley Fruit, Parsley Seed. The dried ripe fruit of *Petroselinum sativum* Hoffmann without admixture of more than 5 per cent of foreign seeds or other matter.

Preparation: U. S. P.—Oleoresina Petroselini.

PETROXOLINUM BETANAPHTHOLIS, N. F. IV. New. Petrox. Betanaphthol.

Betanaphthol Petroxolin, Betanaphthol Petrox. A solution of betanaphthol (10) in liquid petroxolin (to make 100).

PETROXOLINUM CADINI, N. F. IV. New. Petrox. Cadin.

Cade Petroxolin, Cade Petrox. A solution of oil of cade (25) in liquid petroxolin (to make 100).

PETROXOLINUM CHLOROFORMI CAMPHORATUM, N. F. IV. New. Petrox. Chlorof. Camph.

Camphorated Chloroform Petroxolin, Camphor and Chloroform Petrox. A solution of chloroform (25) and camphor (25) in liquid petroxolin (to make 100).

PETROXOLINUM CREOSOTI, N. F. IV. New. Petrox. Creosot.

Creosote Petroxolin, Creosote Petrox. A solution of creosote (20) in oleic acid (5) and liquid petroxolin (to make 100).

PETROXOLINUM EUCALYPTOLIS, N. F. IV. New. Petrox. Eucalyptol.

Eucalyptol Petroxolin, Eucalyptol Petrox. A solution of eucalyptol (20) in liquid petroxolin (to make 100).

PETROXOLINUM GUAIACOLIS, N. F. IV. New. Petrox. Guaiacol.

Guaiacol Petroxolin, Guaiacol Petrox. A solution of guaiacol (20) in oleic acid (5) and liquid petroxolin (to make 100).

PETROXOLINUM HYDRARGYRI, N. F. IV. New. Petrox. Hydrarg.

Mercury Petroxolin, Mercury Petrox. A mixture of mercury (30), hydrous wool fat (13), oleic acid (2), and solid petroxolin (to make 100).

PETROXOLINUM IODI, N. F. IV. New. Petrox. Iod.

Iodine Petroxolin, Iodine Petrox. 10 per cent. A solution of iodine (10) in a mixture of oleic acid (40), alcohol (20), oil of lavender (2), stronger ammonia water (5), and liquid petrolatum (to make 100).

PETROXOLINUM IODI DILUTUM, N. F. IV. New. Petrox. Iod. Dil.

Diluted Iodine Petroxolin, Iodine Petrox. 5 per cent. A solution of iodine (5) in liquid petroxolin (to make 100).

PETROXOLINUM IODOFORMI, N. F. New. Petrox. Iodoform.

Iodoform Petroxolin, Iodoform Petrox. A solution of iodoform (3), in acetone (20), mixed with oleic acid (10), eucalyptol (3), and liquid petroxolin (to make 100).

PETROXOLINUM LIQUIDUM, N. F. IV. Petrox. Liq.

Liquid Petroxolin, Petrolatum Saponatum Liquidum, N. F. III, Liquid Petrox. As modified, a mixture of oleic acid (28), oil of lavender (2), stronger ammonia water (5), alcohol (15), and liquid petrolatum (to make 100).

Preparation: N. F.—Petroxolina (which see).

PETROXOLINUM MENTHOLIS, N. F. IV. New. Petrox. Menthol.

Menthol Petroxolin, Menthol Petrox. A solution of menthol (17) in liquid petroxolin (to make 100).

PETROXOLINUM METHYLIS SALICYLATIS, N. F. IV. New. Petrox. Methyl. Salicyl.

Methyl Salicylate Petroxolin, Methyl Salicylate Petrox. A mixture of methyl salicylate (20) with liquid petroxolin (to make 100).

PETROXOLINUM PHENOLIS, N. F. IV. New. Petrox. Phenol.

Phenol Petroxolin, Phenol Petrox. A solution of phenol (5) in liquid petroxolin (to make 100).

PETROXOLINUM PHENOLIS CAMPHORATUM, N. F. IV. New. Petrox. Phenol. Camph.

Camphorated Phenol Petroxolin, Camphorated Phenol Petrox. A solution of phenol (12.5) and camphor (37.5) in liquid petroxolin (to make 100).

PETROXOLINUM PICIS, N. F. IV. New. Petrox. Pic.

Tar Petroxolin, Tar Petrox. A mixture of oil of tar (35) with liquid petroxolin (to make 100).

PETROXOLINUM SPISSUM, N. F. IV. Petrox. Spiss.

Solid Petroxolin, Solid Petrox. (Petrolatum Saponatum Spissum, N. F. III). As modified, a mixture of white wax (35), oleic acid (32), oil of lavender (3), alcohol (5), stronger ammonia water (5), and liquid petrolatum (to make 100).

Preparation: N. F.—Petroxolinum Hydrargyri.

PETROXOLINUM SULPHURATUM, N. F. IV. New. Petrox. Sulphur.

Sulphurated Petroxolin, Sulphurated Petrox. A solution of sublimed sulphur (3) in linseed oil (37) mixed with oleic acid (30) and liquid petroxolin (to make 100).

Preparation: N. F.—Petroxolinum Sulphurata Compositum.

PETROXOLINUM SULPHURATUM COMPOSITUM, N. F. IV. New.

Petrox. Sulphur Co.

Compound Sulphurated Petroxolin, Compound Sulphurated Petrox. A mixture of sulphur petroxolin (10), oil of cade (10), thymol (0.3), eucalyptol (3), oil of turpentine (30), and liquid petroxolin (to make 100).

PETROXOLINUM TEREBINTHINÆ LARICIS, N. F. IV. New.

Petrox. Terebinth. Laric.

Venice Turpentine Petroxolin, Venice Turpentine Petrox. A mixture of venice turpentine (20) and liquid petroxolin (to make 100).

PHENOL, U. S. P. IX.

Phenol, Carbolic Acid. Official in European pharmacopœias as Acidum Carbolicum (E). Hydroxybenzene obtained from coal-tar or made synthetically. Contains not less than 97 per cent of C_6H_5OH : Tests for identity and purity and a method of assay.

Average dose: 0.06 gm. or 1 grain.

Preparation: U. S. P.—Phenol Liquefactum (which see).

N. F.—Nebula Aromatica, Oleum Phenolatum, Petroxolinum Phenolis, Petroxolinum Phenolis Camphoratum, Phenol Iodatum, Pulvis Antisepticus.

PHENOL IODATUM, N. F. IV.

Phenol. Iodat.

Iodized Phenol, Acidum Carbolicum Iodatum, N. F. III. A solution of iodine (20) and phenol (80) in glycerin (to make 100).

PHENOL LIQUEFACTUM, U. S. P. IX.

Phenol. Liq.

Liquefied Phenol, Liquefied Carbolic Acid. Official in European pharmacopœias as Acidum Carbolicum Liquefactum (E). A liquid containing not less than 87 per cent of C_6H_5OH . Tests for identity and purity.

Average dose: 0.05 mil or 1 minim.

Preparations: U. S. P.—Glyceritum Phenolis, Unguentum Phenolis.

N. F.—Aqua Phenolata, Liquor Iodi Phenolatus, Liquor Sodii Boratis Compositus.

PHENOLPHTHALEINUM, U. S. P. IX. New. Phenolphthal.

Phenolphthalein. A dibasic phenol derivative (dihydroxyphthalophenone) $C_{20}H_{14}O_4$. Tests for identity and purity.

Average dose: 0.15 gm. or $2\frac{1}{2}$ grains.

Preparation: N. F.—Trochisci Phenolphthaleini.

PHENYLIS SALICYLAS, U. S. P. IX. Phenyl. Salicyl.

Phenyl Salicylate, Salol. Official in European pharmacopœias as Salolum (E), Salicylas phenylicus (S). The phenylester, $C_{15}H_{10}O_3$, of salicylic acid. Tests for identity and purity.

Average dose: 0.3 gm. or 5 grains.

PHOSPHORUS, U. S. P. IX. Phosphor.

Phosphorus. The element phosphorus, P. Should be carefully preserved under water. Tests for identity and purity.

Average dose: 0.0005 gm. or $\frac{1}{120}$ grain.

Preparation: U. S. P.—Pilulæ Phosphori.

N. F.—Elixir Phosphori, Liquor Phosphori, Oleum Phosphoratum.

PHYSOSTIGMA, U. S. P. IX. Physostig.

Physostigma, Calabar Bean, Ordeal Bean. The dried ripe seeds of *Physostigma venenosum* Balfour. Yields not less than 0.15 per cent of the alkaloids of physostigma. Method of assay.

Average dose: 0.1 gm. or $1\frac{1}{2}$ grains.

Preparations: U. S. P.—Extractum Physostigmatis, Tinctura Physostigmatis.

PHYSOSTIGMINÆ SALICYLAS, U. S. P. IX. Physostig. Salicyl.

Physostigmine Salicylate, Eserine Salicylate. Official in European pharmacopœias as Physostigminum Salicylicum (E), Salicylas Physostigmaticus (S). The salicylate, $C_{16}H_{21}O_5N_3 \cdot C_7H_5O_3$, of an alkaloid obtained from physostigma. Tests for identity and purity.

Average dose: 0.001 gram or $\frac{1}{80}$ grain.

PHYSOSTIGMINÆ SULPHAS, U. S. P. VIII. Deleted.

PHYTOLACCA, N. F. IV. Part II. From U. S. P. VIII. Phytolac.

Phytolacca, Poke Root. The dried root of *Phytolacca decandra* Linné, collected in the autumn. Yields not more than 14 per cent of ash.

Average dose: Emetic 1 gm. or 15 grains; alterative 0.1 gm. or $1\frac{1}{2}$ grains.

Preparation: N. F.—Fluidextractum Phytolacæ.

PILOCARPINÆ HYDROCHLORIDUM, U. S. P. IX. Pilocarpin. Hydrochl.

Pilocarpine Hydrochloride, Pilocarpine Chloride. Official in European pharmacopœias as Pilocarpinum Hydrochloricum (E), Chloretum Pilocarpicum (S). The hydrochloride $C_{11}H_{16}O_2N_2 \cdot HCl$ of an alkaloid obtained from pilocarpus. Tests for identity and purity.

Average dose: By mouth, 0.01 gm. or $\frac{1}{6}$ grain; hypodermic, 0.005 gm. or $\frac{1}{12}$ grain.

PILOCARPINÆ NITRAS, U. S. P. IX.

Pilocarpin. Nit.

Pilocarpine Nitrate. The nitrate, $C_{11}H_{16}O_2N_2.HNO_3$, of an alkaloid obtained from pilocarpus. Tests for identity and purity.

Average dose: By mouth, 0.01 gm. or $\frac{1}{6}$ grain; hypodermic, 0.005 gm. or $\frac{1}{12}$ grain.

PILOCARPUS, U. S. P. IX.

Pilocarp.

Pilocarpus, Jaborandi. Official in the Swiss pharmacopœia as Folium Jaborandi. The dried leaflets of *Pilocarpus Jaborandi* Holmes known in commerce as Pernambuco Jaborandi, or of *Pilocarpus microphyllus* Stapf, known in commerce as Maranham Jaborandi, without admixture of more than 5 per cent of other matter, and yielding not less than 0.6 per cent of the alkaloids of pilocarpus, and not more than 7 per cent of ash. Each variety is described separately. Method of assay.

Average dose: 2 gm. or 30 grains.

Preparation: Fluidextractum Pilocarpi.

PILULÆ, N. F. IV.

Pills. A general formula with directions for coating pills with gelatin, sugar, cocoa, tolu, silver, and salol.

PILULÆ AD PRANDIUM, N. F. IV.

Pil. Ad Prand.

Dinner Pills.

1. Lady Webster's Dinner Pill. See Pilulæ Aloes et Mastiches, N. F.

2. Chapman's Dinner Pill. Each pill contains aloes (0.097), mastic (0.097), ipecac (0.065), and oil of fennel (0.015).

Average dose: 1 pill.

3. Cole's Dinner Pill. Each pill contains aloes (0.078), mass of mercury (0.078); jalap (0.078), and antimony and potassium tartrate (0.0013).

Average dose: 1 pill.

4. Hall's Dinner Pill. Each pill contains aloes (0.065), extract of glycyrrhiza (0.065), soap (0.065), and syrup (to make 100).

Average dose: 1 pill.

PILULÆ ALOES, U. S. P. IX.

Pil. Aloes.

Pills of aloes. Each pill contains aloes (0.13) and soap (0.13).

Average dose: 2 pills.

PILULÆ ALOES ET ASAFÆTIDÆ, N. F. IV.

Pil. Aloe. et Asafæt.

Pills of Aloes and Asafetida. Each pill contains aloes (0.09), asafetida (0.09), and soap (0.09).

Average dose: 1 pill.

PILULÆ ALOES ET FERRI, N. F. IV. From U. S. P. VIII.

Pil. Aloe. et Ferr.

Pills of Aloes and Iron. Each pill contains aloes (0.07) exsiccated ferrous sulphate (0.07), aromatic powder (0.07), and confection of rose (to make a mass).

Average dose: 2 pills.

PILULÆ ALOES ET MASTICHES, N. F. IV. From U. S. P. VIII.

Pil. Aloe. et Mastich.

Pills of Aloes and Mastic, Webster's Dinner Pill. Each pill contains aloes (0.13), mastic (0.04), and red rose (0.03).

Average dose: 2 pills.

PILULÆ ALOES ET MYRRHÆ, N. F. IV. From U. S. P. VIII.

Pil. Aloe. et Myrrh.

Pills of Aloes and Myrrh. Each pill contains aloes (0.13), myrrh (0.06), and aromatic powder (0.04).

Average dose: 2 pills.

PILULÆ ALOES ET PODOPHYLLI COMPOSITÆ, N. F. IV.

Pil. Aloe. et Podoph. Co.

Compound Pills of Aloes and Podophyllum, Janeway's Pills. Each pill contains aloes (0.065), resin of podophyllum (0.0325), pilular extract of belladonna leaves (0.016), and extract of nux vomica (0.016).

Average dose: 1 pill.

PILULÆ ALOES HYDRARGYRI ET PODOPHYLLI, N. F. IV.

Pil. Aloe. Hydrarg. et Podoph.

Pills of Aloes, Mercury and Podophyllum, Pilulæ Triplices, N. F. III, Triplex Pills, Pilula Triplex. Each pill contains aloes (0.13), mass of mercury (0.065), and resin of podophyllum (0.016).

Average dose: 1 pill.

PILULÆ ALOES HYDRARGYRI ET SCAMMONII COMPOSITA, N. F. IV.

Pil. Aloe. Hydrarg. et Scammon.

Compound Pills of Aloes, Mercury, and Scammony, Francis' Triplex Pills. Each pill contains aloes (0.055), scammony (0.055), mass of mercury (0.055), croton oil (0.0032), oil of caraway (0.016), and tincture of aloes and myrrh (to make a mass).

Average dose: 1 pill.

PILULÆ ALOINI COMPOSITÆ, N. F. IV.

Pil. Aloin. Co.

Compound Pills of Aloin. Each pill contains aloin (0.0325), resin of podophyllum (0.008), and pilular extract of belladonna leaves (0.016).

Average dose: 1 pill.

PILULÆ ALOINI, STRYCHNINÆ ET BELLADONNÆ, N. F. IV.

Pil. A. S. et B.

Pills of Aloin, Strychnine and Belladonna. Each pill contains aloin (0.013), strychnine (0.0005), and pilular extract of belladonna leaves (0.008).

Average dose: 1 pill.

PILULÆ ALOINI, STRYCHNINÆ ET BELLADONNÆ COMPOSITA, N. F. IV.

Pil. A. S. et B. Co.

Compound Pills of Aloin, Strychnine, and Belladonna. Each pill contains aloin (0.013), strychnine (0.0005), pilular extract of belladonna leaves (0.008), and extract of cascara sagrada (0.0325).

Average dose: 1 pill.

PILULÆ ANTIDYSPEPTICÆ, N. F. IV.

Pil. Antidyspep.

Antidyspeptic Pills. Each pill contains strychnine (0.0016), ipecac (0.0065), pilular extract of belladonna leaves (0.0065), mass of mercury (0.13), and compound extract of colocynth (0.13).

Average dose: 1 pill.

PILULÆ ANTIMONII COMPOSITÆ, N. F. IV.

Pil. Antimon. Co.

Compound Pills of Antimony, Plummer's Pills. Each pill contains sulphurated antimony (0.04), mild mercurous chloride (0.04), guaiac (0.08), and castor oil (to make a mass).

Average dose: 1 pill.

PILULÆ ANTINEURALGICÆ—GROSS' ANTINEURALGIC PILLS, N. F. III. Deleted.**PILULÆ ANTINEURALGICÆ—BROWN SEQUARD'S ANTINEURALGIC OR NEURALGIC PILLS, N. F. IV. Deleted.****PILULÆ ANTIPERIODICÆ, N. F. IV.**

Pil. Antiperiod.

Antiperiodic Pills, Warburg's Pills. Each pill contains extract of aloes (0.065), rhubarb (0.032), angelica fruit (0.032), Inula (0.016), saffron (0.016), fennel (0.016), zedoary root (0.008), cubeb (0.008), myrrh (0.008), white agaric (0.008), camphor (0.008), quinine sulphate (0.09), and extract of gentian (to make a mass).

Average dose: 1 pill.

PILULÆ ANTIPERIODICÆ SINE ALOE, N. F. IV.

Pil. Antiperiod. s. Aloe.

Antiperiodic Pills without Aloes. Each pill contains rhubarb (0.032), angelica fruit (0.032), Inula (0.016), saffron (0.016), fennel (0.016), zedoary root (0.008), cubeb (0.008), myrrh (0.008), white agaric (0.008), camphor (0.008), quinine sulphate (0.090), and extract of gentian (to make a mass).

Average dose: 1 pill.

PILULÆ ASAFÆTIDÆ, U. S. P. IX.

Pil. Asafæt.

Pills of Asafetida. Each pill contains asafetida (0.2) and soap (0.06).

Average dose: 2 pills.

PILULÆ CATHARTICÆ COMPOSITÆ, U. S. P. IX.

Pil. Cathart. Co.

Compound Cathartic Pills. Each pill contains compound extract of colocynth (0.08), mild mercurous chloride (0.06), resin of jalap (0.02), gamboge (0.015).

Average dose: 2 pills.

PILULÆ CATHARTICÆ VEGETABILES, N. F. IV.

From U. S. P. VIII.

Pil. Cathart. Veget.

Vegetable Cathartic Pills. Each pill contains compound extract of colocynth (0.06), extract of hyoscyamus (0.03), resin of jalap (0.02), extract of leptandra (0.015), resin of podophyllum (0.015), and oil of peppermint (0.008).

Average dose: 2 pills.

PILULÆ COLOCYNTHIDIS COMPOSITÆ, N. F. IV.

Pil. Colocynth. Co.

Compound Pills of Colocynth, Pilulæ Cocciaë, Cochia Pills. Each pill contains extract of colocynth (0.011), aloes (0.13), resin of scammony (0.13), and oil of clove (0.015).

Average dose: 1 pill.

PILULÆ COLOCYNTHIDIS ET HYOSCYAMI, N. F. IV.

Pil. Colocynth. et Hyoscy.

Pills of Colocynth and Hyoscyamus. Each pill contains extract of colocynth (0.0065), aloes (0.097), resin of scammony (0.097), extract of hyoscyamus (0.097), and oil of clove (0.01).

Average dose: 1 pill.

PILULÆ COLOCYNTHIDIS ET PODOPHYLLI, N. F. IV.

Pil. Colocynth. et Podoph.

Pills of Colocynth and Podophyllum. Each pill contains compound extract of colocynth (0.162) and resin of podophyllum (0.016).

Average dose: 1 pill.

PILULÆ DIGITALIS, SCILLÆ ET HYDRARGYRI, N. F. IV. New.

Pil. Digit. Scil. et Hydrarg.

Pills of Digitalis, Squill, and Mercury, Niemeyer Pills for Dropsy, Guy's Pills. Each pill contains digitalis (0.065), squill (0.065), mass of mercury (0.065), and clarified honey (to make a mass).

Average dose: 1 pill.

PILULÆ FERRI CARBONATIS, U. S. P. IX.

Pil. Ferr. Carb.

Pills of Ferrous Carbonate, Chalybeate Pills, Bland's Pills, Ferruginous Pills. Official in European pharmacopœias as Pilulæ Ferri

Carbonici (E). Each pill contains 0.06 gm. of FeCO_3 . Directions for making and a method of assay.

Average dose: 2 pills.

PILULÆ FERRI COMPOSITÆ, N. F. III. Deleted.

PILULÆ FERRI IODIDI, U. S. P. IX.

Pil. Ferr. Iod.

Pills of Ferrous Iodide. Official in European pharmacopœias as *Pilulæ Ferri Jodati (E)*, *Pilulæ Jodeti Ferrosi (S)*. Each pill represents about 0.06 gm. or ferrous iodide FeI_2 , coated with *tolu.* Directions for making and test for free iodine.

Average dose: 2 pills.

PILULÆ FERRI, QUININÆ, ALOES, ET NUCIS VOMICÆ, N. F. IV.

Pil. Ferr. Quin. Aloe. et Nuc. Vom.

Pills of iron, Quinine, Aloes, and Nux Vomica, *Pilulæ Quadruplices, N. F. III*, *Quadruplex Pills*, *Quator Pills*, *Pilulæ Ferri, et Quininæ Compositæ*. Each pill contains exsiccated ferrous sulphate (0.065), quinine sulphate (0.065), aloes (0.065), extract of nux vomica (0.016), and extract of gentian (to make a mass).

Average dose: 1 pill.

PILULÆ FERRI, QUININÆ, STRYCHNINÆ, ET ARSENI FORTIORES, N. F. IV.

Pil. Ferr. Quin. Strych. et Arsen. Fort.

Stronger Pills of Iron, Quinine, Strychnine, and Arsenic, *Pilulæ Metallorum, N. F. III*, *Metallic Pills*, *Pilulæ Metallorum Amaræ, Bitter Metallic Pills*. Each pill contains reduced iron (0.065), quinine sulphate (0.065), strychnine (0.0032), and arsenic trioxide (0.0032).

Average dose: 1 pill.

PILULÆ FERRI, QUININÆ, STRYCHNINÆ, ET ARSENI MITES, N. F. IV.

Pil. Ferr. Quin. Strych. et Arsen. Mit.

Mild Pills of Iron, Quinine, Strychnine, and Arsenic, *Aitken Tonic Pills*. Each pill contains reduced iron (0.045), quinine sulphate (0.065), strychnine (0.0013), arsenic trioxide (0.0013), and clarified honey (to make 100).

Average dose: 1 pill.

PILULÆ GALBANI COMPOSITÆ, N. F. III. Deleted.

PILULÆ GLONIOINI, N. F. III. See *Pilulæ Glycerylis Nitratis, N. F. IV.*

PILULÆ GLYCERYLIS NITRATIS, N. F. IV.

Pil. Glycer. Nit.

Pills of Nitroglycerin, *Pilulæ Glonoini, N. F. III*, *Pills of Glonoin*. Each pill contains spirit of nitroglycerin (0.065), *althæa* (0.065), and confection of rose (to make a mass).

Average dose: 1 pill.

PILULÆ LAXATIVÆ COMPOSITÆ, N. F. IV. From U. S. P. VIII.

Pil. Lax. Co.

Compound Laxative Pills. Each pill contains aloin (0.013), strychnine (0.0005), pilular extract of belladonna leaves (0.008), ipecac (0.004), glycyrrhiza (0.046), and syrup (to make a mass).

Average dose: 2 pills.

PILULÆ LAXATIVÆ POST PARTUM, N. F. IV. Pil. Lax. Post Part.

Laxative Pills after Confinement, Barker's Post Partum Pills. Each pill contains compound extract of colocynth (0.11), socotrine aloes (0.055), extract of nux vomica (0.025), resin of podophyllum (0.005), ipecac (0.005), and extract of hyoscyamus (0.08).

Average dose: 1 pill.

PILULÆ METALLORUM, N. F. III. See *Pilulæ Ferri*, *Quininæ*, *Strychninæ*, et *Arseni Fortior*, N. F. IV, and *Pilulæ Ferri*, *Quininæ*, *St.*, *Strychninæ* et *Arseni Mitis*, N. F. IV.

PILULÆ OPII, U. S. P. VIII. Deleted.

PILULÆ OPII, DIGITALIS, ET QUININÆ, N. F. IV. New.

Pil. Opii Digit. et Quin.

Pills of Opium, Digitalis, and Quinine, Niemeyer Pills for Phthisis. Each pill contains powdered opium (0.01), digitalis (0.065), quinine sulphate (0.065), and clarified honey (to make a mass).

Average dose: 1 pill.

PILULÆ OPII ET CAMPHORÆ, N. F. IV.

Pil. Opii et Camph.

Pills of Opium and Camphor. Each pill contains powdered opium (0.065) and camphor (0.13).

Average dose: 1 pill.

PILULÆ OPII ET PLUMBI, N. F. IV.

Pil. Opii et Plumb.

Pills of Opium and Lead. Each pill contains powdered opium (0.065) and lead acetate (0.065).

Average dose: 1 pill.

PILULÆ PHOSPHORI, U. S. P. IX.

Pil. Phosphor.

Pills of Phosphorus. Each pill contains phosphorus (0.0006) with diluents and is directed to be coated with a solution of tolu.

Average dose: 1 pill.

PILULÆ PODOPHYLLI BELLADONNÆ ET CAPSICI, U. S. P. VIII. Deleted.

PILULÆ QUADRUPLICES, N. F. III. See *Pilulæ Ferri*, *Quininæ*, *Aloes*, et *Nucis Vomica*, N. F. IV.

PILULÆ RHEI, N. F. IV.

Pil. Rhei.

Pills of Rhubarb. Each pill contains rhubarb (0.2) and soap (0.06).

Average dose: 1 pill.

PILULÆ RHEI COMPOSITÆ, U. S. P. IX. Pil. Rhei Co.

Compound Pills of Rhubarb. Each pill contains rhubarb (0.13), aloes (0.1), myrrh (0.06), and oil of peppermint (0.005).

Average dose: 2 pills.

PILULÆ TRIPLICES, N. F. III.

1. *Pilulæ Triplex*, N. F. III. See *Pilulæ Aloes Hydrargyri et Podophylli*, N. F. IV.

2. Francis' Triplex Pills, N. F. III. See *Pilulæ Hydrargyri et Scammonii Composita*, N. F. IV.

PIMENTA, N. F. IV. Part II. From U. S. P. VIII. Piment.

Pimenta, Pimento, Allspice. The dried nearly ripe fruit of *Pimenta officinalis* Lindley, without admixture of more than 5 per cent of stems or foreign matter. Yields not more than 6 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparation: N. F.—*Tinctura Guaiaci Composita*.

PIMPINELLA, N. F. IV. Part II. Pimpinell.

Pimpinella, Pimpernel Root. The dried rhizome and roots of *Pimpinella saxifraga* Linné or *Pimpinella magna* Linné.

Average dose: 1 gm. or 15 grains.

Preparation: N. F.—*Tinctura Pimpinellæ*.

PINUS ALBA, N. F. IV. Part II. Pinus Alb.

White Pine Bark. The dried inner bark of *Pinus strobus* Linné. Yields not more than 3 per cent of ash.

Preparations: N. F.—*Syrupus Pini Strobi Compositus*, *Syrupus Pini Strobi Compositus cum Morphina*.

PIPER, U. S. P. IX.

Pepper, Black Pepper. The dried unripe fruit of *Piper nigrum* Linné without admixture of more than 2 per cent of stems or other foreign matter.

Average dose: 0.5 gm. or 8 grains.

Preparations: U. S. P.—*Oleoresina Piperis*.

N. F.—*Tinctura Antiperiodica*, *Tinctura Antiperiodica sine Aloe*.

PIPERINA, U. S. P. VIII. Deleted.

PIX LIQUIDA, U. S. P. IX. Pix. Liq.

Tar, Pine Tar. Official in European pharmacopœias as *Pix Pini* (S). Obtained by the destructive distillation of the wood of *Pinus palustris* Miller or of other species of *Pinus*.

Average dose: 0.5 gm. or 8 grains.

Preparations: U. S. P.—*Syrupus Picis Liquidæ*, *Unguentum Picis Liquidæ*. See also *Oleum Picis Liquidæ Rectificatum*.

N. F.—*Glyceritum Picis Liquidæ*, *Vinum Picis*.

PIX LITHANTHRACIS, N. F. IV. Part II.

Pix. Lith.

Coal Tar, Pix Carbonis. The tar obtained as a by-product in the destructive distillation of coal in the manufacture of illuminating gas. On ignition it leaves not more than 2 per cent of ash.

Preparations: N. F.—Liquor Picis Alkalinus, Liquor Picis Carbonis.

PLUMBI ACETAS, U. S. P. IX.

Plumb. Acet.

Lead Acetate, Sugar of Lead. Official in European pharmacopœias as Plumbum Aceticum (E), Acetus Plumbicus (S). Contains from 85.31 to 89.57 per cent of anhydrous lead acetate corresponding to not less than 99.5 per cent of the crystallized salt, $\text{Pb}(\text{C}_2\text{H}_3\text{O}_2)_2 \cdot 3\text{H}_2\text{O}$. Tests for identity and purity and a method of assay.

Average dose: 0.06 gm. or 1 grain.

Preparations: U. S. P.—Liquor Plumbi Subacetatis.

N. F.—Liquor Alumini Acetatis, Lotio Plumbi et Opii, Pilulæ Opii et Plumbi.

PLUMBI CARBONAS, N. F. IV. Part II.

Plumb. Carb.

Lead Carbonate, White Lead. A mixture of lead carbonate and hydroxide approximately $\text{Pb}(\text{CO}_3)_2 \cdot \text{Pb}(\text{OH})_2$. Tests for identity and purity.

Preparation: N. F.—Used in making: Liquor Gutta Perchæ.

PLUMBI IODIDUM, N. F. IV. Part II. From U. S. P. VIII.

Plumb. Iod.

Lead Iodide. Contains not less than 99 per cent of PbI_2 . Tests for identity and purity.

Preparation: N. F.—Unguentum Plumbi Iodidi.

PLUMBI NITRAS, U. S. P. VIII. Deleted.**PLUMBI OXIDUM, U. S. P. IX.**

Plumb. Oxid.

Lead Oxide, Litharge. Official in European pharmacopœias as Plumbum Oxydatum (E), Oxydum Plumbicum (S). Contains when freshly ignited not less than 96 per cent of PbO . Tests for identity and purity and a method of assay.

Preparations: U. S. P.—Used in making: Emplastrum Plumbi, Liquor Plumbi Subacetatis.

PLUMBI OXIDUM RUBRUM, N. F. IV. Part II. Plumb. Oxid. Rub.

Red oxide of Lead, Red Lead. Lead orthoplumbate with usually some unconverted lead monoxide, corresponding to not less than 31 per cent of lead dioxide. Tests for identity and purity.

Preparation: N. F.—Used in making: Emplastrum Fuscum Camphoratum.

PODOPHYLLUM, U. S. P. IX.

Podoph.

Podophyllum, Mandrake, May Apple Rhizome. The dried rhizome and roots of *Podophyllum peltatum* Linné yielding not less than 3 per cent of resin.

Preparations: U. S. P.—Fluidextractum Podophylli, Resina Podophylli.

N. F.—Extractum Podophylli.

POPULI GEMMÆ, N. F. IV. Part II.

Pop. Gem.

Balsam Poplar Buds, Balm of Gilead Buds. The air-dried, closed winter leaf-buds of *Populus nigra* Linné or *populus balsamifera* Linné. Collected early in the spring.

Preparations: N. F.—Syrupus Pini Strobi Compositus, Syrupus Pini Strobi Compositus cum Morphina.

POTASSA CUM CALCE, N. F. IV.

Pot. c. Calc.

Potassa with Lime. A mixture of Potassium hydroxide (50) and calcium oxide (to make 100).

POTASSA SULPHURATA, U. S. P. IX. From N. F. III.

Pot. Sulphurat.

Sulphurated Potassa, Liver of Sulphur. A mixture composed chiefly of potassium polysulphides and potassium thiosulphate and containing an amount of sulphides corresponding to not less than 12.8 per cent of sulphur. Tests for identity and purity and a method of assay.

POTASSII ACETAS, U. S. P. IX.

Pot. Acet.

Potassium Acetate. Contains, when dried, not less than 99 per cent of $KC_2H_3O_2$. Tests for identity and purity and a method of assay.

Average dose: 1 gm. or 15 grains.

Preparations: N. F.—Elixir Buchu et Potassii Acetatis, Elixir Potassii Acetatis, Elixir Potassii Acetatis et Juniperi.

POTASSII BICARBONAS, U. S. P. IX.

Pot. Bicarb.

Potassium Bicarbonate. Official in European pharmacopœias as Kalium Bicarbonicum (E), Bicarbonas Kalicus (S). Contains when dried not less than 99 per cent of $KHCO_3$. Tests for identity and purity and a method of assay.

Average dose: 1 gm. or 15 grains.

Preparations: Used in making: Liquor Potassii Arsenatis, Liquor Magnesii Citratis, Liquor Potassii Citatis.

N. F.—Liquor Antisepticus Alkalinus. Used in making: Liquor Magnesii Sulphatis Effervescens, Liquor Phosphatum Compositum.

POTASSII BITARTRAS, U. S. P. IX.

Pot. Bitart.

Potassium Bitartrate, Cream of Tartar. Official in European pharmacopœias as Kalium Bitartaricum (E), Bitartas Kalicus (S).

Contains when dried not less than 99.5 per cent of $\text{KHC}_4\text{H}_4\text{O}_6$. Tests for identity and purity and a method of assay.

Average dose: 2 gm. or 30 grains.

Preparations: U. S. P.—*Pulvis Jalapæ Compositus*.

N. F.—*Liquor Coccineus*, *Species Laxativæ*, *Trochisci Sulphuris et Potassii Bitartratis*.

POTASSII BROMIDUM, U. S. P. IX.

Pot. Brom.

Potassium Bromide. Official in European pharmacopœias as *Kalium Bromatum* (E), *Brometum Kalicum* (S). Contains when dried not less than 98.5 per cent of KBr . Tests for identity and purity and a method of assay.

Average dose: 1 gm. or 15 grains.

Preparations: N. F.—*Elixir Potassii Bromidi*, *Elixir Trium Bromidorum*, *Liquor Bromi*, *Mistura Chlorali et Potassii Bromidi Composita*, *Sal Potassii Bromidi Effervescens*, *Syrupus Bromidorum*.

POTASSII CARBONAS, U. S. P. IX.

Pot. Carb.

Potassium Carbonate, Salt of Tartar. Official in European pharmacopœias as *Kalium Carbonicum* (E), *Carbonas Kalicus* (S). Contains when dried not less than 99 per cent of K_2CO_3 . Tests for identity and purity and a method of assay.

Average dose: 1 gm. or 15 grains.

Preparations: U. S. P.—*Syrupus Rhei*, *Syrupus Rhei Aromaticus*. Used in making: *Pilulæ Ferri Carbonatis*, *Unguentum Potassii Iodidi*.

N. F.—*Liquor Coccineus*, *Mistura Carminativa*, *Mistura Opii et Sassafras*, *Mistura Rhei Alkalinus*, *Tinctura Guaiaci Composita*, *Tinctura Rhei Aquosa*, *Unguentum Sulphuris Alkalinum*, *Vinum Aurantii Compositum*.

Used in making: *Elixir Formatum*, *Liquor Potassæ Chlorinatæ*, *Mistura Ferri Compositæ*, *Sal Vichyanum Factitium*, *Syrupus Asari Compositus*.

POTASSII CHLORAS, U. S. P. IX.

Pot. Chloras.

Potassium Chlorate. Official in European pharmacopœias as *Kalium Chloricum* (E), *Chloras Kalicus* (S). Contains not less than 99 per cent of KClO_3 . Great caution should be observed in handling it, as dangerous explosions are liable to occur when it is heated or subjected to concussion or trituration with organic substances. Tests for identity and purity and a method of assay.

Average dose: 0.25 gm. or 4 grains.

Preparations: U. S. P.—*Trochisci Potassii Chloratis*.

N. F.—Used in making: *Liquor Chlori Compositus*.

POTASSII CHLORIDUM, N. F. IV. Part II.

Pot. Chlorid.

Potassium Chloride. Contains when dried not less than 99 per cent of KCl . Tests for identity and purity and a method of assay.

Preparations: N. F.—Liquor Hydrastinæ Compositus, Sal Kissin-gense Factitium.

POTASSII CITRAS, U. S. P. IX.

Pot. Cit.

Potassium Citrate. Contains when dried not less than 99 per cent of crystallized $K_3C_6H_5O_7 + H_2O$. Tests for identity and purity and a method of assay.

Average dose: 1 gm. or 15 grains.

Preparations: U. S. P.—Potassii Citras Effervescens.

N. F.—Elixir Cinchonæ Alkaloidorum, Ferri et Calcii Lactophosphatis, Elixir Ferri Hypophosphitis, Elixir Ferri Lactatis, Elixir Hypophosphitum et Ferri, Liquor Ferri Hypophosphitis, Liquor Hypophosphitum Compositus, Syrupus Calcii Lactophosphatis et Ferri, Syrupus Ferri Hypophosphitis.

POTASSII CITRAS EFFERVESCENS, U. S. P. IX.

Pot. Cit. Eff.

Effervescent Potassium Citrate. Contains potassium citrate (20), sodium bicarbonate (47.7), tartaric acid (25.2), and citric acid (to make 100).

Average dose: 4 gm. or 1 drachm.

POTASSII CYANIDUM, U. S. P. VIII. Deleted. See Sodii Cyanidum, U. S. P. IX.

POTASSII DICHROMAS, U. S. P. VIII. Deleted.

POTASSII ET SODII TARTRAS, U. S. P. IX.

Pot. et Sod. Tart.

Potassium and Sodium Tartrate, Rochelle Salt. Official in European pharmacopœias as Kalium Natrio-tartaricum (E), Tartras Natrico-Kalicus (S). Contains from 73.72 to 77.39 per cent of anhydrous potassium and sodium tartrate, corresponding to not less than 99 per cent of the crystallized salt, $KNaC_4H_4O_6 + 4H_2O$. Tests for identity and purity and a method of assay.

Average dose: 10 gm. or 2½ drachms.

Preparation: U. S. P.—Pulvis Effervescens Compositus.

POTASSII FERROCYANIDUM, U. S. P. VIII. Deleted.

POTASSII HYDROXIDUM, U. S. P. IX.

Pot. Hydrox.

Potassium Hydroxide, Caustic Potash, Potassium Hydrate. Official in European pharmacopœias as Kali Causticum Fusum (E), Hydras Kalicus (S). Contains not less than 85 per cent of KOH. Tests for identity and purity and a method of assay.

Preparations: U. S. P.—Liquor Potassii Hydroxidi. Used in making Liquor Cresolis Compositus.

N. F.—Liquor Picis Alkalinus, Potassa cum Calce.

POTASSII HYPOPHOSPHIS, U. S. P. IX.

Pot. Hypophos.

Potassium Hypophosphite. Official in European pharmacopœias as Hypophosphis Kalicus (S). Contains when dried not less than 98

per cent of KPH_2O_2 . Tests for identity and purity and a method of assay. A caution notice warns against triturating this substance with nitrates, chlorates, or other oxidizing agents.

Average dose: 0.5 gm. or 8 grains.

Preparations: U. S. P.—Syrupus Hypophosphitum. Used in making: Acidum Hydriodicum Dilutum.

N. F.—Elixir Hypophosphitum, Elixir Hypophosphitum et Ferri, Emulsum Olei Morrhuae cum Hypophosphitibus, Liquor Hypophosphitum, Liquor Hypophosphitum Compositus, Syrupus Hypophosphitum Compositus.

POTASSII IODIDUM, U. S. P. IX.

Pot. Iod.

Potassium Iodide. Official in European pharmacopœias as Kalium Jodatum (E), Jodetum Kalicum (S). Contains when dried not less than 99 per cent of KI. Tests for identity and purity and a method of assay.

Average dose: 0.3 gm. or 5 grains.

Preparations: U. S. P.—Liquor Iodi Compositus, Unguentum Iodi, Unguentum Potassii Iodidi. Used in making Acidum Hydriodicum Dilutum.

N. F.—Elixir Corydalis Compositum, Elixir Sodii Salicylatis Compositum, Liquor Hydrargyri et Potassii Iodidi, Tinctura Iodi Fortior, Unguentum Potassii Iodidi. Used in making Syrupus Ferri et Manganii Iodidi.

POTASSII NITRAS, U. S. P. IX.

Pot. Nitras.

Potassium Nitrate, Saltpetre. Official in European pharmacopœias as Kalium Nitricum (E), Nitras Kalicus (S). Contains when dried not less than 99 per cent of KNO_3 . Tests for identity and purity and a method of assay.

Average dose: 0.5 gm. or 8 grains.

Preparation: N. F.—Charta Potassii Nitratis.

POTASSII PERMANGANAS, U. S. P. IX.

Pot. Permang.

Potassium Permanganate. Official in European pharmacopœias as Kalium Permanganicum (E), Hypermanganas Kalicus (S). Contains when dried not less than 99 per cent of KMnO_4 . Tests for identity and purity. Cautioning notice warns against triturating potassium permanganate with organic or other readily oxidizable substances.

Average dose: 0.06 gm. or 1 grain.

POTASSII SULPHAS, N. F. IV. Part II. From U. S. P. VIII.

Pot. Sulph.

Potassium Sulphate. Official in foreign pharmacopœias as Sulfas Kalicus (S). Contains when dried not less than 99 per cent of K_2SO_4 . Tests for identity and purity.

Average dose: 1 gm. or 15 grains.

Preparation: N. F.—Sal Carolinum Factitium.

PRUNUM, N. F. IV. Part II. From U. S. P. VIII. Prun.

Prune. The partly dried, ripe fruit of *Prunus domestica* Linné.

Preparation: N. F.—Confectio Sennæ.

PRUNUS VIRGINIANA, U. S. P. IX. Prun. Virg.

Wild Cherry, Wild Black Cherry Bark. The stem-bark of *Prunus serotina* Ehrhart (*Prunus virginia* Miller).

Average dose: 2 gm. or 30 grains.

Preparations: U. S. P.—Syrupus Pruni Virginianæ.

N. F.—Fluidextractum Pruni Virginianæ, Infusum Pruni Virginianæ, Syrupus Cimicifugæ Compositus, Syrupus Pini Strobi Compositus, Syrupus Pini Strobi Compositus cum Morphina, Vinum Pruni Virginianæ.

PULSATILLA, N. F. IV. Part II. Pulsatil.

Pulsatilla, Pasque Flower, Meadow Anemone. The dried herb of *Anemone Pulsatilla* Linné, *Anemone pratensis* Linné, or *Anemone patens* Linné without admixture of more than 5 per cent of foreign matter. Yields not more than 10 per cent of ash.

Average dose: 0.3 gm. or 5 grains.

Preparation: N. F.—Tinctura Pulsatillæ.

PULVERES, N. F. III. Deleted.

PULVERES EFFERVESCENTES, N. F. III. See Sales Effervescentes, N. F. IV.

PULVIS ACACIÆ COMPOSITUS, N. F. III. Deleted.

PULVIS ACETANILIDI COMPOSITUS, N. F. IV. From U. S. P. VIII.

Pulv. Acetanil. Co.

Compound Acetanilid Powder. A mixture of acetanilid (70), caffeine (10), and sodium bicarbonate (to make 100).

Average dose: 0.3 gm. or 5 grains.

PULVIS ALOES ET CANELLÆ, N. F. IV. Pulv. Aloe, et Canell.

Powder of Aloes and Cannelle, Hiera Picra. A mixture of aloes (80) and canella (to make 100).

Average dose: 0.3 gm. or 5 grains.

PULVIS AMYGDALÆ COMPOSITUS, N. F. III. Deleted.

PULVIS ANTICATARRHALIS, N. F. III. Deleted.

PULVIS ANTIMONIALIS, N. F. IV. Pulv. Antimon.

Antimonial Powder, James' Powder. A mixture of antimony oxide (33) and precipitated calcium phosphate (to make 100).

Average dose: 0.2 gm. or 3 grains.

PULVIS ANTISEPTICUS, N. F. IV. Pulv. Antisept.

Soluble Antiseptic Powder, Pulvis Antisepticus Solubilis. A mixture of salicylic acid (0.5), phenol (0.1), eucalyptol (0.1), menthol

(0.1), thymol (0.1), zinc sulphate (12.5), and boric acid (to make 100).

PULVIS AROMATICUS, U. S. P. IX. Pulv. Arom.

Aromatic Powder. A mixture of Saigon cinnamon (35), Jamaica ginger (35), cardamom seed (15), and myristica (to make 100).

Average dose: 1 gm. or 15 grains.

Preparations: U. S. P.—Fluidextractum Aromaticum.

N. F.—Pilulæ Aloes et Ferri, Pilulæ Aloes et Myrrhæ.

PULVIS AROMATICUS RUBEFACIENS, N. F. IV. Pulv. Arom. Rubefac.

Rubefacient Spice Powder, Emplastrum Aromaticum, N. F. III. A mixture of clove (30), saigon cinnamon (30), ginger (20), and capsicum (to make 100). For spice poultice the required quantity of spice powder is placed in a muslin bag and moistened with hot diluted alcohol or vinegar.

PULVIS CATECHU COMPOSITUS, N. F. III. See Pulvis Gambir Compositus, N. F. IV.

PULVIS CRETÆ AROMATICUS, N. F. IV. Pulv. Cret. Arom.

Aromatic Powder of Chalk. A mixture of Saigon Cinnamon (8), myristica (6), clove (3), cardamom seed (2), prepared chalk (25), and sugar (to make 100).

Average dose: 2 gm. or 30 grains.

PULVIS CRETÆ AROMATICUS CUM OPIO, N. F. III. See Pulvis Cretæ et Opii Aromaticus, N. F.

PULVIS CRETÆ COMPOSITUS, U. S. P. IX. Pulv. Cret. Co.

Compound Chalk Powder. A mixture of prepared chalk (30), acacia (20), and sugar (to make 100).

Average dose: 2 gm. or 30 grains.

Preparation: U. S. P.—Mistura Cretæ.

PULVIS CRETÆ ET OPII AROMATICUS, N. F. IV.

Pulv. Cret. et Opii. Arom.

Aromatic Powder of Chalk and Opium. A mixture of powdered opium (2.5) and aromatic powder of chalk (to make 100).

Average dose: 1 gm. or 15 grains.

PULVIS EFFERVESCENS COMPOSITUS, U. S. P. IX. Pulv. Eff. Co.

Compound Effervescing Powder, Seidlitz Powder. Official in European pharmacopœias as Pulvis Ærophorus Laxans (E). The blue powder contains sodium bicarbonate (2.5 gm.), and potassium and sodium tartrate (7.5 gm.). The white powder contains tartaric acid (2.15 gm.). Assay methods for sodium bicarbonate and for potassium and sodium tartrate have been included.

Average dose: 1 set of two powders.

PULVIS FERRI ET QUININÆ CITRATIS EFFERVESCENS, N. F. III.
Deleted.

PULVIS FERRI PHOSPHATIS EFFERVESCENS, N. F. III. Deleted.

PULVIS GAMBIR COMPOSITUS, N. F. IV. Pulv. Gambir. Co.

Compound Powder of Gambir, Pulvis Catechu Compositus, N. F. III. A mixture of gambir (40), krameria (20), kino (20), saigon cinnamon (10), and myristica (to make 100).

Average dose: 1.3 gm. or 20 grains.

PULVIS GLYCYRRHIZÆ COMPOSITUS, U. S. P. IX.

Pulv. Glycyrrh. Co.

Compound Powder of Glycyrrhiza, Compound Licorice Powder. Official in European pharmacopœias as Pulvis Liquiritiæ Compositus (E). A mixture of senna (18), glycyrrhiza (23.6), washed sulphur (8), oil of fennel (0.4), and sugar (to make 100). Tests for identity and purity.

Average dose: 4 gm. or 1 drachm.

PULVIS HYDRARGYRI CHLORIDI MITIS ET JALAPÆ, N. F. IV.

Pulv. Hydrarg. Chlor. Mit. et Jalap.

Powder of Mild Mercurous Chloride and Jalap, Calomel and Jalap. A mixture of mild mercurous chloride (34) and jalap (to make 100).

Average dose: 0.65 gm. or 10 grains.

PULVIS IODOFORMI COMPOSITUS, N. F. III. Deleted.

PULVIS IPECACUANHÆ ET OPII, U. S. P. IX. Pulv. Ipecac et Opii.

Powder of Ipecac and Opium. Compound Powder of Ipecac, Dover's Powder. Official in European pharmacopœias as Pulvis Ipecacuanhæ Opiatus (E), included in the International Protocol as Opii et Ipecacuanhæ Pulvis Compositus (P. I.). A mixture of ipecac (10), powdered opium (10), and sugar of milk (to make 100).

Average dose: 0.5 gm. or 8 grains.

PULVIS JALAPÆ COMPOSITUS, N. F. IX.

Pulv. Jalap. Co.

Compound Powder of Jalap, Pulvis Purgans. A mixture of jalap (35) and potassium bitartrate (to make 100).

Average dose: 2 gm. or 30 grains.

PULVIS KINO COMPOSITUS, N. F. III. See Pulvis Kino et Opii Compositus, N. F. IV.

PULVIS KINO ET OPII COMPOSITUS, N. F. IV.

Pulv. Kino et Opii Co.

Compound Powder of Kino and Opium, Pulvis Kino Compositus, N. F. III. A mixture of kino (75), powdered opium (5), and Saigon cinnamon (to make 100).

Average dose: 1 gm. or 15 grains.

PULVIS MORPHINÆ COMPOSITUS, U. S. P. VIII. Deleted.

PULVIS MYRICÆ COMPOSITUS, N. F. IV. Pulv. Myric. Co.

Compound Powder of Bayberry, Composition Powder. A mixture of bayberry bark (60), ginger (30), capsicum (5), and clove (to make 100).

Average dose: 1 gm. or 15 grains.

PULVIS PANCREATICUS COMPOSITUS, N. F. III. See Pulvis Pancreatini Compositus, N. F.

PULVIS PANCREATINI COMPOSITUS, N. F. IV.

Pulv. Pancreat. Co.

Compound Pancreatic Powder, Pulvis Pancreaticus Compositus, N. F. III. Peptonizing Powder. A mixture of Pancreatin (20) and sodium bicarbonate (to make 100).

NOTE: Directions for peptonizing fresh milk and a caution not to keep peptonized milk longer than 24 hours.

PULVIS PEPSINI COMPOSITUS, N. F. III. Deleted.

PULVIS POTASSII BROMIDI EFFERVESCENS, N. F. III. See Sal Potassii Bromidi Effervescens, N. F. IV.

PULVIS POTASSII BROMIDI EFFERVESCENS CUM CAFFEINA, N. F. III. See Sal Potassii Bromidi Effervescens Compositum, N. F. IV.

PULVIS PRO LACTE HUMANISATO, N. F. III. Deleted.

PULVIS RHEI COMPOSITUS, U. S. P. IX. Pulv. Rhei Co.

Compound Powder of Rhubarb. Gregory's Powder. A mixture of rhubarb (25), Jamaica ginger (10), and magnesium oxide (to make 100).

Average dose: 2 gm. or 30 grains.

PULVIS RHEI ET MAGNESIÆ ANISATUS, N. F. IV.

Pulv. Rhei et Magnes. Anis.

Anisated Powder of Rhubarb and Magnesia, Compound Anise Powder. A mixture of rhubarb (35), anethol (8), alcohol (10), and heavy magnesium oxide (to make 100).

Average dose: Infants, 0.3 gm. or 5 grains.

PULVIS SALIS CAROLINI FACTITII EFFERVESCENS, N. F. III. See Sal Carolinum Factitium Effervescens, N. F. IV.

PULVIS SALIS KISSINGENSIS FACTITII EFFERVESCENS, N. F. III. See Sal Kissingense Factitium Effervescens, N. F. IV.

PULVIS SALIS VICHYANI FACTITII EFFERVESCENS, N. F. III. See Sal Vichyanum Factitium Effervescens, N. F. IV.

PULVIS SALIS VICHYANI FACTITII EFFERVESCENS CUM LITHIO, N. F. III. See Sal Vichyanum Factitium Effervescens cum Lithio, N. F. IV.

PULVIS TALCI SALICYLICUS, N. F. III. See *Pulvis Talci Compositus*, N. F. IV.

PULVIS TALCI COMPOSITUS, N. F. IV. Pulv. Talc. Co.

Compound Powder of Talc, *Pulvis Talci Salicylicus*, N. F. III.
Boro-Salicylated Powder of Talc. A mixture of salicylic acid (3), boric acid (10), and talc (to make 100).

PUMEX, N. F. IV. Part III.

Pumice. A substance of volcanic origin, consisting chiefly of complex silicates of aluminum, potassium, and sodium. Tests for purity.

Preparations: N. F.—Used in making: *Elixir Eriodictyi Aromaticum*, *Mistura Chlorali et Potassii Bromidi Composita*, *Tinctura Guaiaci Composita*, *Vinum Picis*.

PYRETHRUM, U. S. P. IX.

Pyreth.

Pyrethrum, Pellitory Root. The dried root of *Anacyclus Pyrethrum* De Candolle.

Average dose: 2 gm. or 30 grains.

Preparation: U. S. P.—*Tinctura Pyrethri*.

PYROGALLOL, U. S. P. IX.

Pyrogall.

Pyrogallol, **Pyrogallic Acid**. Official in the European pharmacopœias as *Pyrogallolum* (E). Trihydroxybenzene, $C_6H_3(OH)_3$, 1:2:3. Tests for identity and purity. Melting point now reads from 128 to 132°.

PYROXYLINUM, U. S. P. IX.

Pyroxolin.

Pyroxolin, Soluble Gun Cotton. A product obtained by the action of a mixture of nitric and sulphuric acids on cotton and consisting chiefly of cellulose tetranitrate, $C_{12}H_{16}(ONO_2)_4O_6$. Tests for identity and purity. Residue on incineration leaves not more than 0.3 per cent of ash.

Preparation: U. S. P.—*Collodium* (which see).

QUASSIA, U. S. P. IX.

Quass.

Quassia, Bitter Wood. Official in European pharmacopœias as *Lignum Quassiae* (E). The wood of *Picrasma excelsa* Planchon, known in commerce as Jamaica Quassia, or of *Quassia amara* Linné, known in commerce as Surinam Quassia. Described separately.

Average dose: 0.5 gm. or 8 grains.

Preparations: U. S. P.—*Tinctura Quassiae*.

N. F.—*Extractum Quassiae*, *Fluidextractum Quassiae*.

QUERCUS, N. F. IV. Part II. From U. S. P. VIII.

Querc.

Quercus. White Oak Bark. The dried bark of the trunk and branches of *Quercus alba* Linné deprived of the periderm. Yields not more than 7 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparation: N. F.—*Fluidextractum Quercus*.

QUILLAJA, N. F. IV. Part II. From U. S. P. VIII.

Quillaja, Soap-tree Bark. The dried bark of *Quillaja saponaria* Molina, deprived of the periderm. Yields not more than 10 per cent of ash.

Preparations: N. F.—Liquor Picis Carbonis, Tinctura Quillajæ.

QUINIDINA, N. F. IV. Part II.

Quinidin.

Quinidine. An alkaloid, isomeric with quinine obtained from the bark of various species of *Cinchona*. Tests for identity and purity.

Average dose: Tonic, 0.1 gm. or $1\frac{1}{2}$ grains; anti-malarial, 1 gm. or 15 grains daily.

Preparation: N. F.—Syrupus Quinidinæ.

QUININA, U. S. P. IX.

Quin.

Quinine. An alkaloid, $C_{20}H_{24}O_2N_2 + 3H_2O$, obtained from the bark of various species of *Cinchona*. Tests for identity and purity. Yields not more than 0.1 per cent of ash.

Average dose: Tonic, 0.1 gm. or $1\frac{1}{2}$ grains; anti-malarial, at least 1 gm. or 15 grains daily.

Preparations: N. F.—Elixir Formatum Compositum, Oleatum Quininæ, Syrupus Hypophosphitum Compositum, Syrupus Ferri, Quininæ et Strychninæ Phosphatum.

QUININÆ BISULPHAS, U. S. P. IX.

Quin. Bisulph.

Quinine Bisulphate. Official in European pharmacopœias as Chininum Bisulfuricum (E). The acid sulphate $C_{20}H_{24}O_2N_2 \cdot H_2SO_4 + 7H_2O$ of the alkaloid quinine. Tests for identity and purity. Yields not more than 0.05 per cent of ash.

Average dose: Tonic, 0.1 gm. or $1\frac{1}{2}$ grains; anti-malarial, at least 1 gm. or 15 grains daily.

Preparations: N. F.—Tinctura Antiperiodica, Tinctura Antiperiodica sine Aloe.

QUININÆ DIHYDROCHLORIDUM, U. S. P. IX. New.

Quin. Dihydrochl.

Quinine Dihydrochloride. The dihydrochloride $C_{20}H_{24}O_2N_2 \cdot 2HCl$, of the alkaloid quinine. Tests for identity and purity. Leaves not more than 0.05 per cent of ash.

Average dose: Tonic, 0.1 gm. or $1\frac{1}{2}$ grains; anti-malarial at least 1 gm. or 15 grains.

QUININÆ ET UREÆ HYDROCHLORIDUM, U. S. P. IX. New.

Quin. et Urea. Hydrochl.

Quinine and Urea Hydrochloride, Quinine and Urea Chloride. A compound of the hydrochlorides of quinine and urea $C_{20}H_{24}O_2N_2 \cdot HClCO(NH_2)_2 \cdot HCl + 5H_2O$ which contains not less than 58 per cent

of anhydrous quinine. Tests for identity and purity and a method of assay. Yields not more than 0.05 per cent of ash.

Average dose: Hypodermic (one dose daily) 1 gm. or 15 grains.

QUININÆ GLYCEROPHOSPHAS, N. F. IV. Part II.

Quin. Glycerophos.

Quinine glycerophosphate, Quinine Glycerinophosphate. A glycerophosphate $(C_{20}H_{24}O_2N_2)_2PO_4H_2(C_3H_7O_2) + 4H_2O$ of the alkaloid quinine. Tests for identity and purity.

Average dose: Tonic, 0.1 gm. or $1\frac{1}{2}$ grains; anti-malarial, 1 gm. or 15 grains daily.

Preparation: N. F.—Elixir Glycerophosphatum Compositum.

QUININÆ HYDROBROMIDUM, U. S. P. IX.

Quin. Hydrobr.

Quinine Hydrobromide, Quinine Bromide. Official in European pharmacopœias as Chininum Hydrobromicum (E). The hydrobromide, $C_{20}H_{24}O_2N_2 \cdot HBr + H_2O$ of the alkaloid quinine. Tests for identity and purity. Yields not more than 0.05 per cent of ash.

Average dose: Tonic, 0.1 gm. or $1\frac{1}{2}$ grains; anti-malarial at least 1 gm. or 15 grains daily.

QUININÆ HYDROCHLORIDUM, U. S. P. IX.

Quin. Hydrochl.

Quinine Hydrochloride, Quinine Chloride. Official in European pharmacopœias as Chininum Hydrochloricum (E); Chloretum Chinicum (S). The hydrochloride, $C_{20}H_{24}O_2N_2 \cdot HCl + 2H_2O$, of the alkaloid quinine. Tests for identity and purity. Yields not more than 0.05 per cent of ash.

Average dose: Tonic, 0.1 gm. or $1\frac{1}{2}$ grains; anti-malarial, at least 1 gm. or 15 grains.

Preparations: N. F.—Elixir Ferri, Quininæ et Strychninæ, Syrupus Phosphatum cum Quininæ et Strychninæ.

QUININÆ HYPOPHOSPHIS, N. F. IV. Part II.

Quin. Hypophos.

Quinine Hypophosphite. The hypophosphite, $C_{20}H_{24}O_2N_2 \cdot HPH_2O_2 + H_2O$ of the alkaloid quinine. Tests for identity and purity.

Average dose: Tonic 0.1 gm. or $1\frac{1}{2}$ grains; anti-malarial 1 gm. or 15 grains daily.

Preparation: N. F.—Liquor Hypophosphitum Compositum.

QUININÆ SALICYLAS, U. S. P. IX.

Quin. Salicyl.

Quinine Salicylate. Official in European pharmacopœias as Chininum Salicylicum (E). The salicylate $C_{20}H_{24}O_2N_2 \cdot C_7H_6O_3 + H_2O$ of the alkaloid quinine. Tests for identity and purity. Leaves not more than 0.05 per cent of ash.

Average dose: Tonic, 0.1 gm. or $1\frac{1}{2}$ grains; anti-malarial at least 1 gm. or 15 grains.

QUININÆ SULPHAS, U. S. P. IX. Quin. Sulph.

Quinine Sulphate. Official in European pharmacopœias as Chininum Sulfuricum (E), Sulfas Chinicus (S). The sulphate $(C_{20}H_{24}O_2N_2)_2 \cdot H_2SO_4 + 7H_2O$ of the alkaloid quinine. Tests for identity and purity. Leaves not more than 0.05 per cent of ash.

Average dose: Tonic, 0.1 gm. or $1\frac{1}{2}$ grains; anti-malarial at least 1 gm. or 15 grains daily.

Preparations: N. F.—Elixir Cinchonæ Alkaloidorum (which see), Elixir Ferri Pyrophosphatis, Quininæ et Strychninæ, Pilulæ Antiperiodicæ, Pilulæ Antiperiodicæ sine Aloe, Pilulæ Ferri Quininæ, Aloes et Nucis Vomice, Pilulæ Ferri, Quininæ, Strychninæ et Arsenici Fortior, Pilulæ Ferri, Quininæ, Strychninæ et Arsenici Mitis, Pilulæ Opii, Digitalis et Quininæ.

QUININÆ TANNAS, U. S. P. IX. Quin. Tann.

Quinine Tannate. Official in European pharmacopœias as Chininum Tannicum (E). A compound of the alkaloid quinine with tannic acid, of somewhat varying composition and containing from 30 to 35 per cent of anhydrous quinine, $C_{20}H_{24}O_2N_2$. Tests for identity and purity and a method of assay. Yields not more than 0.3 per cent of ash.

Average dose: 0.2 gm. or 3 grains.

Preparation: N. F.—Trochisci Quininæ Tannatis.

QUININÆ VALERAS, N. F. IV. Part II. Quin. Valer.

Quinine Valerate. The valerate of the alkaloid quinine. Tests for identity and purity.

Average dose: Tonic, 0.1 gm. or $1\frac{1}{2}$ grains; anti-malarial 1 gm. or 15 grains daily.

Preparation: N. F.—Elixir Quininæ Valeratis et Strychninæ.

RENNINUM, N. F. IV. Part II. Rennin.

Rennin. The partially purified, milk-curdling enzyme obtained from the glandular layer of the stomach of the calf, *Bos taurus*, Linné, and capable of coagulating not less than 25,000 times its weight of normal, fresh cow's milk.

Preparation: N. F.—Elixir Pepsini et Rennini Compositum.

RESINA, U. S. P. IX. Resin.

Rosin, Colophony, Resin. Official in European pharmacopœias as Colophonium (E), Resina Colophonium (S). The residue left after distilling the volatile oil from the concrete oleoresin obtained from *Pinus palustris* Miller and from other species of *Pinus*.

Preparations: U. S. P.—Ceratum Cantharidis, Ceratum Resinæ, Emplastrum Resinæ.

N. F.—Ceratum Resinæ Compositum.

RESINA JALAPÆ, U. S. P. IX.

Res. Jalap.

Resin of Jalap. Jalap extracted with alcohol and the resulting solution of resin precipitated with water. Tests for identity and purity.

Average dose: 0.125 gm. or 2 grains.

Preparations: U. S. P.—*Pilulæ Catharticæ Compositæ*.

N. F.—*Pilulæ Catharticæ Vegetabiles*.

RESINA PODOPHYLLI, U. S. P. IX.

Res. Podoph.

Resin of Podophyllum, Podophyllin. Official in European pharmacopœias as Podophyllum (E). Podophyllum extracted with alcohol and the resulting solution of resin precipitated with acidulated water. Tests for identity and purity. Yields not more than 1.5 per cent of ash.

Average dose: 0.01 gm. or $\frac{1}{8}$ grain.

Preparations: N. F.—*Pilulæ Aloes et Podophylli Compositæ*, *Pilulæ Aloes Hydrargyri et Podophylli*, *Pilulæ Aloini Compositæ*, *Pilulæ Catharticæ Vegetabiles*, *Pilulæ Colocynthis et Podophylli*, *Pilulæ Laxativæ Post Partum*.

RESINA SCAMMONIÆ, U. S. P. IX.

Res. Scamm.

Resin of Scammony. Scammony Root extracted with alcohol and the resulting solution of resin precipitated with water. Tests for identity and purity. Yields not more than 1 per cent of ash.

Average dose: 0.2 gm. or 3 grains.

Preparations: U. S. P.—*Extractum Colocynthis Compositum*.

N. F.—*Pilulæ Aloes, Hydrargyri et Scammonii Compositæ*, *Pilulæ Colocynthis Compositæ*, *Pilulæ Colocynthis et Hyoscamii, Tinctura Jalapæ Composita*.

RESORCINOL, U. S. P. IX.

Resorcin.

Resorcinol, Resorcin. Official in European pharmacopœias as Resorcinum (E). Metadihydroxybenzene. Contains not less than 99.5 per cent of $C_6H_4(OH)_2$, 1:3. Tests for identity and purity and a method of assay.

Average dose: 0.125 gm. or 2 grains.

Preparations: N. F.—*Pasta Resorcinolis Fortisr*, *Pasta Resorcinolis Mitis*, *Unguentum Resorcinolis Compositum*.

RHAMNUS CATHARTICA, N. F. IV. Part II.

Rham. Cathart.

Rhamnus Cathartica, Buckthorn Berries, *Bacca Spinæ Cervinæ*. The dried, ripe fruit of *Rhamnus cathartica* Linné, without admixture of more than 5 per cent of unripe fruit or other foreign matter. Yields not more than 5 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparations: N. F.—*Fluidextractum Rhamni Catharticæ*, *Syrupus Rhamni Catharticæ*.

RHAMNUS PURSHIANA, U. S. P. VIII. See *Cascara Sagrada*, U. S. P. IX.

RHEUM, U. S. P. IX.

Rhubarb. Official in European pharmacopœias as *Rhizoma Rhei* (E). The rhizomes and roots of *Rheum officinale* Baillon, *Rheum palmatum* Linné and the var. *tanguticum* Maximowicz, and probably other species of *Rheum* growing in China and Thibet. Yields not more than 13 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparations: U. S. P.—*Extractum Rhei*, *Fluidextractum Rhei*, *Pilulæ Rhei Compositæ*, *Pulvis Rhei Compositus*, *Tinctura Rhei*, *Tinctura Rhei Aromatica* (which see).

N. F.—*Fluidglyceratum Rhei*, *Pilulæ Antiperiodicæ*, *Pilulæ Antiperiodicæ sine Aloe*, *Pilulæ Rhei*, *Pulvis Rhei et Magnesiæ Anisatus*, *Syrupus Sennæ Aromaticus*, *Tinctura Antiperiodica*, *Tinctura Antiperiodica sine Aloe*, *Tinctura Rhei Aquosa*, *Tinctura Rhei Dulcis*, *Tinctura Rhei et Gentianæ*, *Tinctura Zedoariæ Amara*.

RHUS GLABRA, N. F. IV. Part II. From U. S. P. VIII.

Rhus Glab.

Rhus Glabra, Sumac Berries. The dried, ripe fruit of *Rhus glabra* Linné without admixture of more than 5 per cent of stems or foreign matter. Yields not more than 4 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparation: N. F.—*Fluidextractum Rhois Glabræ*.

ROSA GALLICA, U. S. P. IX.

Rosa Gall.

Red Rose. The dried petals of *Rosa gallica* Linné. Yields not more than 3.5 per cent of ash.

Preparations: U. S. P.—*Fluidextractum Rosæ* (which see).

N. F.—*Confectio Rosæ*, *Infusum Rosæ Compositum*, *Pilulæ Aloes et Mastiches*.

RUBI FRUCTUS, N. F. IV. Part II.

Blackberries. The fresh, ripe fruit of varieties of *Rubus nigrobaccus* Bailey or *Rubus villosus* Aiton.

Preparation: N. F.—*Syrupus Rubi Fructi*.

RUBI IDÆI FRUCTUS, N. F. IV. Part II.

Raspberries. The fresh, ripe fruit of varieties of *Rubus Idæus* Linné.

Preparation: N. F.—*Syrupus Rubi Idæi*.

RUBUS, N. F. IV. Part II. From U. S. P. VIII.

Rubus, Blackberry Bark. The dried bark of the rhizome of *Rubus villosus* Aiton, *Rubus nigrobaccus* Bailey, or of *Rubus cuneifolius* Pursh. Yields not more than 5 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparations: N. F.—Elixir Rubi Compositum, Fluidextractum Rubi.

RUMEX, N. F. IV. Part II.

Rumex, Yellow Dock, Broad-Leaved Dock, Curled Dock. The roots of *Rumex crispus* Linné, or of *Rumex obtusifolius* Linné, without admixture of more than 5 per cent of stem bases. Yields not more than 10 per cent of ash.

Average dose: 4 gm. or 1 drachm.

Preparation: N. F.—Fluidextractum Rumicis.

SABAL, U. S. P. IX.

Sabal, Saw Palmetto Berries. The partially dried ripe fruit of *Serenoa serrulata* Hooker filius.

Average dose: 1 gm. or 15 grains.

Preparations: U. S. P.—Fluidextractum Sabal.

N. F.—Tinctura Sabal et Santali.

SABINA, U. S. P. VIII. Deleted.

SACCHARUM, U. S. P. IX.

Sacch.

Sugar, Sucrose. Sucrose, $C_{12}H_{22}O_{11}$ obtained from cultivated varieties of *Saccharum officinarum* Linné and from *Beta vulgaris* Linné var. *Rapa dumort* and from other sources. Tests for identity and purity and a method of assay.

Preparations: U. S. P.—Syrupus, Official syrups and other preparations.

N. F.—Syrupi and other preparations.

SACCHARUM LACTIS, U. S. P. IX.

Sacch. Lact.

Sugar of Milk, Milk Sugar, Lactose. Lactose, $C_{12}H_{22}O_{11} + H_2O$, obtained from the whey of cow's milk. Tests for identity and purity.

Preparations: U. S. P.—Pulvis Ipecacuanhæ et Opii, Triturationes Trituatio Elaterini.

N. F.—Pepsinum Saccharatum.

SAFROLUM, U. S. P. VIII. Deleted.

SALICINUM, U. S. P. IX.

Salicin.

Salicin. A glucoside, $C_{13}H_{18}O_7$, obtained from several species of *Salix* and *Populus*. Melts between 198° and 202° .

Average dose: 1 gm. or 15 grains.

SALIA EFFERVESCENTIA, N. F. IV. New.

Granular Effervescent Salts. General directions for making.

SAL CAROLINUM FACTITIUM, N. F. IV.

Sal Carol. Fact.

Artificial Carlsbad Salt. The dry, amorphous form contains potassium sulphate (28), sodium chloride (18), sodium bicarbonate (36), and sodium sulphate (to make 100).

The crystalline form contains essentially the same constituents with water of crystallization (to make about 180).

NOTE: 1 gm. of the dry or 1.75 gm. of the crystalline salt in 200 mls of water is similar to an equal volume of Carlsbad water in its main constituents.

Preparation: N. F.—*Sal Carolinum Factitium Effervescens*.

SAL CAROLINUM FACTITIUM EFFERVESCENS, N. F. IV.

Sal Carol. Fact. Eff.

Effervescent Artificial Carlsbad Salt. (*Pulvis Salis Carolini Factitii Effervescens, N. F. III.*) As modified, a mixture of artificial Carlsbad salt dry (26.6), sodium bicarbonate (40), tartaric acid (15.7), and citric acid (to make 100).

Average dose: 6 gm. or 90 grains.

NOTE: A solution of 6 gm. in 200 mls of water is similar to an equal volume of Carlsbad water in its main constituents.

SAL KISSINGENSE FACTITIUM, N. F. IV.

Sal Kissingen. Fact.

Artificial Kissingen Salt. As modified, a mixture of potassium chloride (1.7), sodium chloride (35.7), magnesium sulphate (12), and sodium bicarbonate (10.7).

NOTE: 1.5 gm. in 200 mls of water is similar to an equal volume of Kissingen water in its main constituents.

Preparations: N. F.—*Sal Kissingense Factitium Effervescens*.

SAL KISSINGENSE FACTITIUM EFFERVESCENS, N. F. IV.

Sal Kissingen. Fact. Eff.

Effervescent Artificial Kissingen Salt. (*Pulvis Salis Kissingensis Factitii Effervescens, N. F. III.*) As modified, a mixture of artificial Kissingen salt (40), sodium bicarbonate (40.6), tartaric acid (9.4), and citric acid (to make 100).

Average dose: 5.5 gm. or 80 grains.

NOTE: 5.5 gm. in 200 mls of water is similar to an equal volume of Kissingen water in its main constituents.

SAL LITHII CITRATIS EFFERVESCENS, N. F. IV. From U. S. P. VIII.

Sal. Lith. Cit. Eff.

Effervescent Salt of Lithium Citrate. (*Lithii Citras Effervescens U. S. P. VIII, Effervescent Lithium Citrate.*) A mixture of lithium citrate (5), sodium bicarbonate (57), tartaric acid (30), and citric acid (to make 100).

Average dose: 8 gm. or 120 grains.

SAL POTASSII BROMIDI EFFERVESCENS, N. F. IV.

Sal Pot. Brom. Eff.

Effervescent Salt of Potassium Bromide. (*Pulvis Potassii Bromidi Effervescens, N. F. III.*) As modified, a mixture of potassium

bromide (16.6), sodium bicarbonate (53), tartaric acid (20.4), and citric acid (to make 100).

Average dose: 6 gm. or 90 grains.

SAL POTASSII BROMIDI EFFERVESCENS COMPOSITUS, N. F. IV.

Sal Pot. Brom. Eff. Co.

Compound Effervescent Salt of Potassium Bromide, Effervescent Potassium Bromide with Caffeine. (Pulvis Potassii Bromidi Effervescens cum Caffeina, N. F. III.) As modified, a mixture of sodium bicarbonate (58.7), caffeine (0.8), potassium bromide (8.3), lithium carbonate (4.2), tartaric acid (18), and citric acid (to make 100).

Average dose: 6 gm. or 90 grains.

SALVIA, U. S. P. VIII. Deleted.

SAL VICHYANUM FACTITIUM, N. F. IV.

Sal Vichy. Fact.

Artificial Vichy Salt. As modified, represents a mixture of sodium bicarbonate (84.6), potassium carbonate (3.8), magnesium sulphate (8), and sodium chloride (7.7) (to make about 100).

NOTE: 1 gm. in 200 mls of water is similar to an equal volume of Vichy water in its main constituents.

Preparations: N. F.—Sal Vichyanum, Factitium Effervescens, Sal Vichyanum Factitium Effervescens et Lithii.

SAL VICHYANUM FACTITIUM EFFERVESCENS, N. F. IV.

Sal Vichy. Fact. Eff.

Effervescent Artificial Vichy Salt. (Pulvis Salis Vichyani Factitii Effervescens, N. F. III.) As modified, a mixture of artificial vichy salt (25) sodium bicarbonate (48.55), tartaric acid (16.45), and citric acid (25) (to make about 100).

Average dose: 4 gm. or 60 grains.

NOTE: 3.75 gm. or 200 mls of water is similar to an equal volume of vichy water (Grand Grille Spring) in its main constituents.

SAL VICHYANUM FACTITIUM EFFERVESCENS ET LITHIO, N. F. IV.

Sal Vichy. Fact. Eff. c. Lith.

Effervescent Artificial Vichy Salt with Lithium. (Pulvis Salis Vichyani Factitii Effervescens cum Lithio, N. F. III.) As modified, a mixture of artificial vichy salt (25), lithium citrate (8.33), sodium bicarbonate (44.14), tartaric acid (12.54), and citric acid (25) (to make about 100).

Average dose: 6 gm. or 90 grains.

SAMBUCUS, N. F. IV. Part II.

Sambuc.

Sambucus, Elder Flowers. The air-dried flowers of *Sambucus canadensis* Linné or of *Sambucus nigra* Linné, separated from the peduncles or pedicels. Yields not more than 8 per cent of ash.

Average dose: 4 gm. or 1 drachm.

Preparations: N. F.—Fluidextractum *Stillingiæ Compositum*.
Species Laxativæ.

SANGUINARIA, U. S. P. IX.

Sanguin.

Sanguinaria, Blood Root. The dried rhizome and roots of *Sanguinaria canadensis* Linné.

Average dose: 0.125 gm. or 2 grains.

Preparations: U. S. P.—Tinctura Sanguinariæ.

N. F.—Fluidextractum Sanguinariæ, Syrupus Pini Strobi Compositus, Syrupus Pini Strobi Compositus cum Morphina.

SANTALUM ALBUM, N. F. IV. Part II.

Santal. Alb.

Sandal Wood, White Sandal Wood. The heart wood of *Santalum Album* Linné. Yields not more than 8 per cent of ash.

Preparation: N. F.—Tinctura Sabal et Santali.

SANTALUM RUBRUM, U. S. P. IX.

Santal. Rub.

Red Saunders. Official in European pharmacopœias as Lignum Santali Rubrum (E). The heart-wood of *Pterocarpus santalinus* Linné. Yields not more than 3 per cent of ash.

Preparation: U. S. P.—Tinctura Lavandulæ Composita.

SANTONICA, U. S. P. VIII. Deleted.

SANTONINUM, U. S. P. IX.

Santonin.

Santonin. The inner anhydride or lactone $C_{15}H_{18}O_5$ of santonic acid obtained from *Artemisia pauciflora* Weber. Melts between 169° and 171° . Leaves not more than 0.1 per cent of ash.

Average dose: 0.06 gm. or 1 grain.

Preparations: N. F.—Trochisci Santonini, Trochisci Santonini Compositi.

SAPO, U. S. P. IX.

Soap, White Castile Soap. Official in European pharmacopœias as Sapo Medicatus (E). Soap prepared from olive oil and sodium hydroxide. Tests for identity and purity.

Preparations: U. S. P.—Extractum colocynthidis compositum, Linimentum Saponis (which see), Pilulæ Aloes, Pilulæ Asafetidæ.

N. F.—Emplastrum Saponis, Pilulæ Ad Prandium, Hall's, Pilulæ Aloes et Asafetidæ, Pilulæ Rhei.

SAPO MOLLIS, U. S. P. IX.

Sapo Moll.

Soft soap. Official in European pharmacopœias as Sapo Kalinus (E). Now prepared from cottonseed oil and potassium hydroxide. Directions for making. Tests for identity and purity.

Preparations: U. S. P.—Linimentum Saponis Mollis.

N. F.—Pasta Naphtholi, Lassar, Linimentum Saponis Mollis Compositum, Unguentum Sulphuris Compositum.

SARSAPARILLA, U. S. P. IX.

Sarsap.

Sarsaparilla. Official in European pharmacopœias as *Radix Sarsaparillæ* (E). The dried root of *Smilax medica* Chamisso and Schlechtendal, known in commerce as Mexican Sarsaparilla, or *Smilax officinalis* Kunth or an undetermined species of smilax; known in commerce as Honduras Sarsaparilla; or *Smilax ornata* Hooker, filius, known in commerce as Jamaica Sarsaparilla. Each variety described separately. Yields not more than 10 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparations: U. S. P.—Fluidextractum Sarsaparillæ (which see), Fluidextractum Sarsaparillæ Compositum.

N. F.—Decoctum Sarsaparillæ Compositum.

SASSAFRAS, U. S. P. IX.

Sassaf.

Sassafras. The bark of the root of *Sassafras variifolium* O. Kuntze, without admixture of more than 2 per cent of adhering wood. Yields not more than 30 per cent of ash.

Average dose: 10 gm. or 2½ drachms.

Preparations: U. S. P.—Fluidextractum Sarsaparillæ Compositum.

N. F.—Decoctum Sarsaparillæ Compositum, Syrupus Pini Strobi Compositus, Syrupus Pini Strobi Compositus cum Morphina.

SASSAFRAS MEDULLA, N. F. IV. Part II. From U. S. P. VIII.

Sassaf. Med.

Sassafras Pith. The dried pith of *Sassafras variifolium* O. Kuntze.

Preparation: N. F.—Mucilago Sassafras Medullæ.

SCAMMONIÆ RADIX, U. S. P. IX. New.

Scamm. Rad.

Scammony Root. The dried root of *Convolvulus Scammonia*, Linné, yielding not less than 8 per cent of the total resins of scammony root. Method of assay.

Average dose: 0.25 gm. or 4 grains

Preparation: U. S. P.—Resina Scammonia (which see).

SCAMMONIUM, U. S. P. VIII. Deleted.

SCILLA, U. S. P. IX.

Scill.

Squill. Official in European pharmacopœias as *Bulbus Scillæ* (E). The fleshy, inner scales of the bulb of the white variety of *Urginea maritima* Baker cut into pieces and carefully dried. Yields not more than 8 per cent of ash. Biological method of assay.

Average dose: 0.1 gm. or 1½ grains.

Preparations: U. S. P.—Acetum Scillæ (which see), Fluidextractum Scillæ (which see), Tinctura Scillæ.

N. F.—Pilulæ Digitalis, Scillæ et Hydrargyri.

SCOPARIUS, N. F. IV. Part II. From U. S. P. IX.

Scopar.

Scoparius, Broom Tops. The dried top of *Cytisus scoparius* Link. Yields not more than 5 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparation: N. F.—Fluidextractum Scoparii.

SCOPOLA, U. S. P. VIII. Deleted.

SCOPOLAMINÆ HYDROBROMIDUM, U. S. P. IX.

Scopolamin. Hydrobrom.

Scopolamine Hydrobromide, Hyoscine Hydrobromide, Scopolamine Bromide. Official in European pharmacopœias as Scopolamicum Hydrobromicum (E), Brometum Scopolamicum (S). The hydrobromide, $C_{17}H_{21}NO_4HBr + 3HO$, of lævorotatory scopolamine, also known as hyoscine, obtained from various plants of the *solanaceæ*. Tests for identity and purity.

Average dose: 0.0003 gm. or $\frac{1}{2000}$ grain.

SCUTELLARIA, N. F. IV. Part II. From U. S. P. VIII. Scutell.

Scutellaria, Skullcap. The dried plant of *Scutellaria lateriflora* Linné. Yields not more than 12 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparation: N. F.—Fluidextractum Scutellarisæ, Tinctura Viburni Opoli Composita.

SENECIO, N. F. IV. Part II.

Senecio, Life Root. The dried overground portions of *Senecio aureus* Linné gathered when flowering.

Average dose: 4 gm. or 1 drachm.

Preparation: N. F.—Fluidextractum Senecionis.

SENEGA, U. S. P. IX.

Seneg.

Senega, Seneca Snakeroot, Senega Snakeroot. Official in European pharmacopœias as Radix Senegæ (E). The dried roots of *Polygala Senega* Linné, without admixture of more than 5 per cent of stems and other foreign matter. Yields not more than 5 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparations: U. S. P.—Fluidextractum Senegæ (which see).

SENNA, U. S. P. IX.

Senn.

Senna. Official in European pharmacopœias as Folia Sennæ (E). The dried leaflets of *Cassia acutifolia* Delile, known in commerce as Alexandria Senna, or of *Cassia angustifolia* Vahl, known in commerce as India Senna without admixture of more than 10 per cent of stem tissues, pods, seeds, and other impurities. Yields not more than 2 per cent of ash. The ash insoluble in HCl is not more than 3 per cent of the senna taken.

Average dose: 4 gm. or 1 drachm.

Preparations: U. S. P.—Fluidextractum Sennæ (which see), Infusum Sennæ Compositum, Pulvis Glycyrrhizæ Compositus.

N. F.—Confectio Sennæ, Species Laxativæ.

SERPENTARIA, U. S. P. IX.

Serpent.

Serpentaria, Texas Snakeroot, Virginia Snakeroot. The dried rhizome and roots of *Aristolochia serpentaria* Linné, known in com-

merce as Virginia Snakeroot, or of *Aristolochia reticulata*. Nuttall, known in commerce as Texas Snakeroot, without admixture of more than 10 per cent of the stems or other foreign matter.

Average dose: 1 gm. or 15 grains.

Preparations: U. S. P.—Tinctura Cinchonæ Composita.

N. F.—Fluidextractum Serpentariæ, Tinctura Serpentariæ.

SERUM ANTIDIPHThERICUM, U. S. P. IX.

Ser. Antidiph.

Antidiphtheric Serum, Diphtheria Antitoxin. A fluid having a potency of not less than 250 antitoxic units per mil, separated from the coagulated blood of the horse, *Equus Caballus* Linné, or other large domestic animal, which has been properly immunized against diphtheria toxin. The standard of strength expressed in units of antitoxic power shall be that established by the United States Public Health Service.

Average dose: Hypodermic, curative 10,000 units; protective, 1,000 units.

SERUM ANTIDIPHThERICUM PURIFICATUM, U. S. P. IX. New.

Ser. Antidiph. Purif.

Purified Antidiphtheric Serum, Antidiphtheric Globulin, Concentrated Diphtheria Antitoxin, Diphtheric Antitoxin Globulins, Refined and Concentrated Diphtheria Antitoxin. A solution in physiologic solution of sodium chloride, of certain antitoxic proteins obtained from the blood serum or plasma of the horse *Equus Caballus* Linné, or other large domestic animal, which has been properly immunized against diphtheria toxin.

Average dose: Hypodermic, curative 10,000 units; protective, 1,000 units.

SERUM ANTIDIPHThERICUM SICCUM, U. S. P. IX. New.

Ser. Antidiph. Sicc.

Dried Antidiphtheric Serum, Dried Diphtheria Antitoxin. Obtained by the evaporation of either antidiphtheric serum or purified antidiphtheric serum. Must comply with the requirements under serum antidiphthericum.

Average dose: Hypodermic, curative, 10,000 units; protective, 1,000 units.

SERUM ANTITETANICUM, U. S. P. IX. New.

Ser. Antitetan.

Antitetanic Serum, Tetanus Antitoxin. A fluid separated from the coagulated blood of the horse, *Equus Caballus* Linné, or other large domestic animal, which has been properly immunized against tetanus toxin.

Average dose: Hypodermic, curative, 10,000 units; protective, 1,500 units.

SERUM ANTITETANICUM PURIFICATUM, U. S. P. IX. New.

Ser. Antitetan. Purif.

Purified Antitetanic Serum, Antitetanic Globulins, Concentrated Tetanus Antitoxin, Refined and Concentrated Tetanus Antitoxin, Tetanus Antitoxin Globulins. A solution in physiologic solution of sodium chloride of certain antitoxic proteins obtained from the blood or plasma of the horse, *Equus Caballus* Linné, or other large domestic animal, which has been properly immunized against tetanus toxin. Must comply with the requirements for loss of potency, control, labeling, and standard for potency under Serum Antitetanicum.

Average dose: Hypodermic, curative, 10,000 units; protective, 1,500 units.

SERUM ANTITETANICUM SICCUM, U. S. P. IX. New.

Ser. Antitetan. Sicc.

Dried Antitetanic Serum, Dried Tetanus Antitoxin. Obtained by the evaporation of either antitetanic serum or purified antitetanic serum. Must comply with the requirements for control and labeling under Serum Antitetanicum, and the standard of strength expressed in units of antitoxic power shall be that established by the United States Public Health Service.

Average dose: Hypodermic, curative, 10,000 units; protective, 1,500 units.

SEVUM BENZOINATUM, N. F. IV. New.

Sev. Benz.

Benzoinated Suet. Contains soluble constituents of benzoin (3) in prepared suet (to make 100).

Preparations: N. F.—Mulla Acidi Salicylici, Mulla Creosoti, Salicylata, Mulla Hydrargyri Chloridi Corrosivi, Mulla Zinci.

SEVUM PRÆPARATUM, U. S. P. IX.

Sev. Præp.

Prepared Suet, Mutton Suet. Official in European pharmacopœias as Sebum Ovis (E). The internal fat of the abdomen of the sheep, purified by melting and straining. Tests for identity and purity. Saponification value from 193 to 200. Iodine value from 33 to 48.

Preparations: U. S. P.—Unguentum Hydrargyri.

N. F.—Ceratum Resinæ Compositum, Sevum Benzoinum, Unguentum Fuscum.

SINAPIS ALBA, U. S. P.

Sinap. Alb.

White Mustard, Yellow Mustard. Official in European pharmacopœias as Semen Sinapis (E). The ripe seeds of *Sinapis alba* Linné, without admixture of more than 5 per cent of other seeds or other foreign matter. Yields not more than 9 per cent of ash.

Average dose: Emetic, 10 gm. or 2½ drachms.

SINAPIS NIGRA, U. S. P. IX.

Sinap. Nig.

Black Mustard, Brown Mustard. Official in European pharmacopœias as Semen Sinapis Nigræ (E). The ripe seeds of *Brassica nigra* Koch, without admixture of more than 5 per cent of other seeds or other foreign matter. Yields not more than 9 per cent of ash.

Average dose: Emetic, 10 gm. or 2½ drachms.

Preparation, U. S. P.—Emplastrum Sinapis.

SODA CUM CALCE, N. F. IV.

Sod. c. Calc.

Soda with Lime, London Paste. Contains sodium hydroxide (50) and calcium oxide (to make 100).

SODII ACETAS, U. S. P. IX.

Sod. Acet.

Sodium Acetate. Official in European pharmacopœias as Natrium Aceticum (E). Contains from 59.97 to 62.96 per cent of anhydrous sodium acetate, corresponding to not less than 99.5 per cent of the crystallized salt, $\text{NaC}_2\text{H}_3\text{O}_2 + 3 \text{H}_2\text{O}$. Tests for identity and purity and a method of assay.

Average dose: 1 gm. or 15 grains.

SODII ARSENAS, U. S. P. IX.

Sod. Arsen.

Sodium Arsenate. Included in the International Protocol as Natrium Arsenicum (P. I.). Contains from 58.98 to 61.92 per cent of anhydrous sodium arsenate (disodium ortho-arsenate), corresponding to not less than 99 per cent of the crystallized salt, $\text{Na}_2\text{HAsO}_4 + 7\text{H}_2\text{O}$.

Average dose: 0.005 gm. or $\frac{1}{12}$ grain.

Preparation: U. S. P.—Sodii Arsenas Exsiccatus.

SODII ARSENAS EXSICCATUS, U. S. P. IX

Sod. Arsen. Exsic.

Exsiccated Sodium Arsenate. Contains when dried not less than 98 per cent of Na_2HAsO_4 . Tests for identity and purity and a method of assay.

Average dose: 0.003 gm. or $\frac{1}{20}$ grain.

Preparations: U. S. P.—Liquor Sodii Arsenatis.

N. F.—Liquor Sodii Arsenatis, Pearson.

SODII BENZOAS, U. S. P. IX.

Sod. Benz.

Sodium Benzoate. Official in European pharmacopœias as Natrium Benzoicum (E). Contains when dried not less than 99 per cent of $\text{NaC}_7\text{H}_5\text{O}_2$. Tests for identity and purity and a method of assay.

Average dose, 1 gm. or 15 grains.

Preparations: N. F.—Caffeine Sodio-Benzoas, Liquor Antisepticus, Liquor Antisepticus, Alkalinus, Sodii Boro-Benzoas.

SODII BENZOSULPHINIDUM, U. S. P. IX. New. Sod. Benzosulphin.
Sodium Benzosulphinide, Sodium-Saccharin, Soluble Saccharin.
The sodium salt $\text{NaC}_6\text{H}_4\text{O}_2\text{NS} + 2\text{H}_2\text{O}$, of benzosulphinide. Tests
for identity and purity. Average dose: 0.2 gm or 3 grains.
Preparations: N. F.—Trochisci Quininæ Tannatis.

SODII BICARBONAS, U. S. P. IX. Sod. Bicarb.
Sodium Bicarbonate. Official in European pharmacopœias as
Natrium Bicarbonicum (E), Bicarbonas Natricus Depuratus (S).
Contains when dried not less than 99 per cent of NaHCO_3 . Tests
for identity and purity and a method of assay.

Average dose: 1 gm. or 15 grains.

Preparations: U. S. P.—Trochisci Sodii Bircarbonatis. Used
in making: Caffeina Citrata Effervescens, Ferri Carbonas Saccha-
ratus, Pulvis Effervescens Compositus, Sodii Phosphas Effervescens.

N. F.—Liquor Pancreatini, Liquor Sodæ et Menthæ, Mistura
Rhei Composita, Mistura Rhei et Sodæ, Pulvis Acetanilidi Com-
positus, Pulvis Pancreaticus Compositus. Used in making: Glycer-
itum Bismuthi, Liquor Phosphatum Compositus, Liquor Sodii
Boratis Compositus, Liquor Sodii Citratis, Liquor Sodii Citro-Tar-
tratis Effervescens, Liquor Citras Effervescens, Sales Effervescentes.

SODII BICARBONAS SACCHARATUS, N. F. III. Deleted.

SODII BISULPHIS, U. S. P. VIII. Deleted.

SODII BORAS, U. S. P. IX. Sod. Bor.

Sodium Borate, Borax, Sodium Tetraborate, Sodium Pyroborate.
Official in European pharmacopœias as Borax (E), Biboras Na-
tricus (S). Contains from 52.32 to 54.93 per cent of anhydrous
sodium borate (Sodium baborate or tetraborate), corresponding to
not less than 99 per cent of the crystallized salt, $\text{Na}_2\text{B}_4\text{O}_7 + 10\text{H}_2\text{O}$.
Tests for identity and purity. Method of assay.

Average dose: 0.75 gm. or 12 grains.

Preparations: U. S. P.—Unguentum Aquæ Rosæ.

N. F.—Liquor Antisepticus Alkalinus, Liquor Sodii Boratis
Compositus, Mel Rosæ et Sodii Boratis, Mel Sodii Boratis, Sodii
Boro-Benzoas.

SODII BORO-BENZOAS, N. F. IV. Sod. Boro-Benz.

Sodium Boro-Benzoate. Contains sodium borate (43) and sodium
benzoate (to make 100).

Average dose: 2 gm. or 30 grains.

SODII BROMIDUM, U. S. P. IX. Sod. Brom.

Sodium Bromide. Official in European pharmacopœias as
Natrium Bromatum (E), Brometum Natricum (S). Contains when

dried not less than 98.5 per cent of NaBr. Tests for identity and purity and a method of assay.

Average dose: 1 gm. or 15 grains.

Preparations: N. F.—Elixir Sodii Bromidi, Elixir Bromidorum, Syrupus Bromidorum.

SODII CACODYLAS, U. S. P. IX. New. Sod. Cacody.

Sodium Cacodylate. Sodium dimethylarsenate $\text{Na}(\text{CH}_3)_2\text{AsO}$ with a somewhat variable amount of water of crystallization. Contains from 72 to 75 per cent of $\text{Na}(\text{CH}_3)_2\text{AsO}$. Tests for identity and purity and a method of assay.

Average dose: 0.06 gm. or 1 grain.

SODII CARBONAS EXSICCATUS, N. F. III. Deleted.

SODII CARBONAS MONOHYDRATUS, U. S. P. IX. Sod. Carb. Monohyd.

Monohydrated Sodium Carbonate. The crystalline salt is official in European pharmacopœias as Natrium Carbonicum (E). Carbonas Natrius (S). Contains not less than 99.5 per cent of $\text{Na}_2\text{CO}_3 + \text{H}_2\text{O}$. Tests for identity and purity. Method of assay.

Average dose: 0.25 gm. or 4 grains.

Preparations: U. S. P.—Used in making Liquor Sodæ Chlorinatæ, Massa Ferri Carbonatis, Suppositoria Glycerini.

N. F.—Used in making: Elixir Formatum, Elixir Formatum Compositum, Ferri Oxidum Saccharatum, Linimentum Saponato-Camphoratum, Liquor Alumini Acetico-Tartratis, Sal Carolinum Factitium.

SODII CHLORAS, U. S. P. VIII. Deleted.

SODII CHLORIDUM, U. S. P. IX. Sod. Chlorid.

Sodium Chloride. Official in European pharmacopœias as Natrium Chloratum (E), Chloretum Natrium (S). Contains when dried not less than 99 per cent of NaCl. Tests for identity and purity and a method of assay.

Average dose: 15 gm. or 4 drachms.

Preparations: U. S. P.—Liquor Sodii Chloridi Physiologicus.

N. F.—Liquor Pancreatini, Lotio Ammoniacalis Camphorata, Sal Carolinum Factitium, Sal Kissingense Factitium, Sal Vichyanum Factitium.

SODII CITRAS, U. S. P. IX. Sod. Cit.

Sodium Citrate. Official in the Norwegian pharmacopœia as Citras Natrius. Contains not less than 98 per cent of $\text{Na}_2\text{C}_6\text{H}_5\text{O}_7 + 2\text{H}_2\text{O}$. Tests for identity and purity and a method of assay.

Average dose: 1 gm. or 15 grains.

Preparations: N. F.—Elixir Gentianæ, Liquor Ferri Albuminati, Liquor Ferri Peptonati, Liquor Ferri Peptonati et Mangani, Syrupus Hypophosphitum Compositus, Tinctura Ferri Citro-Chloridi.

SODII CYANIDUM, U. S. P. IX. New. Sod. Cyanid.

Sodium Cyanide. Contains not less than 95 per cent of NaCN. Replaces Potassium Cyanide of the U. S. P. VIII. Tests for identity and purity and a method of assay.

SODII GLYCEROPHOSPHAS, U. S. P. IX. New. Sod. Glycerophos.

Sodium Glycerophosphate. Sodium Glycerinophosphate. Hydrated sodium glycerophosphate containing not less than 68 per cent of the anhydrous salt, $\text{Na}_2\text{C}_3\text{H}_7\text{PO}_6$. Tests for identity and purity and a method of assay.

Average dose: 0.25 gm. or 4 grains.

Preparations: N. F.—Elixir Calcii et Sodii Glycerophosphatum, Elixir Glycerophosphatum Compositum.

SODII HYDROXIDUM, U. S. P. IX. Sod. Hydrox.

Sodium Hydroxide, Caustic Soda, Soda, Sodium Hydrate. Official in European pharmacopœias as Natrium Causticum (E), Hydras Natrius (S). Contains not less than 90 per cent of NaOH. Tests for identity and purity and a method of assay.

Preparations: U. S. P.—Liquor Sodii Hydroxidi.

N. F.—Soda cum Calce.

SODII HYPOPHOSPHIS, U. S. P. IX. Sod. Hypophos.

Sodium Hypophosphite. Contains when dried not less than 98 per cent of $\text{NaPH}_2\text{O}_2 + \text{H}_2\text{O}$. Tests for identity and purity and a method of assay.

Average dose: 1 gm. 15 grains.

Preparations: U. S. P.—Syrupus Hypophosphitum.

N. F.—Elixir Cinchonæ Alkaloidarum et Hypophosphitum, Elixir Hypophosphitum, Elixir Hypophosphitum cum Ferro, Elixir Sodii Hypophosphitis, Emulsum Olei Morrhuæ cum Hypophosphitibus, Liquor Hypophosphitum, Liquor Hypophosphitum Compositus, Syrupus Calcii et Sodii Hypophosphitum, Syrupus Hypophosphitum Compositus, Syrupus Sodii Hypophosphitis.

SODII INDIGOTINDISULPHONAS, U. S. P. IX. New. Sod. Indigotin.

Sodium Indigotindisulphonate, Indigo Carmine. Chiefly the sodium salt $\text{C}_{16}\text{H}_8\text{O}_2\text{N}_2(\text{SO}_3\text{Na})_2$, of indigotindisulphonic acid. Tests for identity and purity.

SODII IODIDUM, U. S. P. IX. Sod. Iod.

Sodium Iodide. Official in European pharmacopœias as Natrium Jodatum (E), Jodetum Natrium (S). Contains when dried not less than 99 per cent of NaI. Contains not more than 7 per cent of moisture.

Average dose: 0.3 gm. or 5 grains.

SODII NITRAS, U. S. P. VIII. Deleted.

SODII NITRIS, U. S. P. IX.

Sod. Nitris.

Sodium Nitrite. Official in European pharmacopœias as Natrium Nitrosum (E). Contains when dried not less than 95 per cent of NaNO_2 . Tests for identity and purity and a method of assay.

Average dose: 0.06 gm. or 1 grain.

SODII PERBORAS, U. S. P. IX. New.

Sod. Perbor.

Sodium Perborate. Official in European pharmacopœias as Natrium Phosphoricum (E), Phosphas Natricus (S). Contains not less than 9 per cent of available oxygen, corresponding to about 86.5 per cent of $\text{NaBO}_3 + 4\text{H}_2\text{O}$. Tests for identity and purity and a method of assay.

Average dose: 0.06 gm. or 1 grain.

SODII PHENOLSULPHONAS, U. S. P. IX.

Sod. Phenolsulph.

Sodium Phenolsulphonate. Sodium Sulphocarbolate. Contains from 83.64 to 87.82 per cent of anhydrous sodium phenolsulphonate (Sodium parphenolsulphonate, corresponding to not less than 99 per cent of the crystallized salt $\text{NaC}_6\text{H}_4\text{O.SO}_3 + 2\text{H}_2\text{O}$).

Average dose: 0.25 gm. or 4 grains.

SODII PHOSPHAS, U. S. P. IX.

Sod. Phos.

Sodium Phosphate. Contains from 39.25 to 44 per cent of anhydrous sodium phosphate (di-sodium-ortho-phosphate), corresponding to not less than 99 per cent of the crystallized salt $\text{Na}_2\text{HPO}_4 + 12\text{H}_2\text{O}$. Tests for identity and purity and a method of assay.

Average dose: 4 gm. or 1 drachm.

Preparations: U. S. P.—Sodii Phosphas Exsiccatus (which see).

N. F.—Liquor Sodii Phosphatis Compositus.

SODII PHOSPHAS EFFERVESCENTS, U. S. P. IX.

Sod. Phos. Eff.

Effervescent Sodium Phosphate. A mixture of exsiccated sodium phosphate (20), sodium bicarbonate (47.7), tartaric acid (25.2), and citric acid (to make 100).

Average dose: 10 gm. or 2½ drachms.

SODII PHOSPHAS EXSICCATUS, U. S. P. IX.

Sod. Phos. Exsic.

Exsiccated Sodium Phosphate. Official in European pharmacopœias as Natrium Phosphoricum Siccum (E). Contains when dried not less than 98 per cent of Na_2HPO_4 . Tests for identity and purity and a method of assay.

Average dose: 2 gm. or 30 grains.

Preparation: R. S. P.—Sodii Phosphas Effervescens.

SODII PYROPHOSPHAS, U. S. P. VIII. Deleted.**SODII SALICYLAS, U. S. P. IX.**

Sod. Salicyl.

Sodium Salicylate. Official in European pharmacopœias as Natrium Salicylicum (E), Salicylas Natricus (S). Contains when

dried not less than 99.5 per cent of $\text{NaC}_7\text{H}_5\text{O}_3$. Tests for identity and purity and a method of assay.

Average dose: 1 gm. or 15 grains.

Preparations: N. F.—Caffeinæ Sodio-Salicylas, Elixir Sodii Salicylatis, Elixir Sodii Salicylatis Compositum, Liquor Antisepticus, Liquor Ferri Salicylatis.

SODII SULPHAS, U. S. P. IX.

Sod. Sulph.

Sodium Sulphate, Glauber's Salt. Official in European pharmacopœias as Natrium Sulfuricum (E), Sulfas Natrius (S). Contains from 43.64 to 48 per cent of anhydrous sodium sulphate, corresponding to not less than 99 per cent of the crystallized salt $\text{Na}_2\text{SO}_4 + 10\text{H}_2\text{O}$. Tests for identity and purity and a method of assay.

Average dose: 15 gm. or 4 drachms.

Preparation: N. F.—Sal Carolinum Factitium.

SODII SULPHIS, U. S. P. VIII. See Sodii Sulphis Exsiccatus, U. S. P.

SODII SULPHIS EXSICCATUS, U. S. P. IX. New. Sod. Sulphis Exsic.

Exsiccated Sodium Sulphate. Contains not less than 90 per cent of Na_2SO_3 . Tests for identity and purity and a method of assay.

Average dose: 1 gm. or 15 grains.

SODII THIOSULPHAS, U. S. P. IX.

Sod. Thiosulph.

Sodium Thiosulphate, Sodium Hyposulphite. Official in European pharmacopœias as Natrium Thiosulphuricum (E). Contains from 63.07 to 67.48 per cent of anhydrous sodium thiosulphate, corresponding to not less than 99 per cent of the crystallized salt $\text{Na}_2\text{S}_2\text{O}_3 + 5\text{H}_2\text{O}$. Tests for identity and purity and a method of assay.

Average dose: 1 gm. or 15 grains.

Preparations: N. F.—Tinctura Iodi Decolorata, Unguentum Potassii Iodidi.

SOLANUM, N. F. IV. Part II.

Solan.

Solanum, Horse-nettle Berries. The air-dried ripe fruit of *Solanum carolinense* Linné. Yields not more than 6 per cent of ash.

Average dose: 4 gm. or 1 drachm.

Preparation: N. F.—Fluidextractum Solani.

SPARTEINÆ SULPHAS, U. S. P. IX.

Sparteïn Sulph.

Sparteïne Sulphate. Official in European pharmacopœias as Spar-teïnium Sulfuricum (E), Sulfas Sparteicus (S). The sulphate $\text{C}_{15}\text{H}_{23}\text{N}_2\text{H}_2\text{SO}_4 + 5\text{H}_2\text{O}$, of sparteïne, a liquid alkaloid obtained from *Cytisus Scoparius* Link. Tests for identity and purity. Ash not to exceed 0.1 per cent.

Average dose: 0.01 gm. or $\frac{1}{4}$ grain.

SPECIES EMOLLIENTES, N. F. IV.

Spec. Emoll.

Emollient Species, Emollient Cataplasma. Contains althæa leaves (20), mallow leaves (20), Melilot (20), matricaria (20), and flaxseed (to make 100).

NOTE: Emollient poultice is made by adding a suitable quantity of hot water.

SPECIES LAXANTES, N. F. III. See Species Laxativæ, N. F.

SPECIES LAXATIVÆ, N. F. IV.

Spec. Lax.

Laxative Species, Species Laxantes, N. F. III, St. Germain Tea. Contains senna (40), elder flowers (25), fennel (12.5), anise (12.5), and potassium bitartrate (to make 100).

Average dose: 1.3 gm. or 20 grains.

SPECIES PECTORALES, N. F. IV.

Spec. Pect.

Pectoral Species, Species ad Infusum Pectorale, Breast Tea. Contains althæa (40), coltsfoot (20), glycyrrhiza (15), anise (10), mullein flowers (10), and orris root (to make 100).

Average dose: 4 gm. or 1 drachm.

SPIGELIA, U. S. P. IX.

Spigel.

Spigelia, Pinkroot, Indian Pink, Worm Grass. The dried rhizome and roots of *Spigelia marilandica* Linné without admixture of more than 10 per cent of stems or other foreign matter. Yields not more than 10 per cent of ash.

Average dose: 4 gm. or 60 grains.

Preparations: U. S. P.—Fluidextractum Spigeliæ.

SPIRITUS ACIDI FORMICI, N. F. IV.

Sp. Ac. Formic.

Spirit of Formic Acid, Spiritus Formicarum, Spirit of Ants. Contains formic acid (4), distilled water (22.5), and alcohol (to make 100).

Average dose: 4 mls or 1 fluidrachm.

SPIRITUS ÆTHERIS, U. S. P. IX.

Sp. Æth.

Spirit of Ether, Hoffmann's Drops. Official in European pharmacopœias as Spiritus Æthereus (E), Æther Spirituosus (S). A mixture of ether (32.5) with alcohol (to make 100).

Average dose: 4 mls or 1 fluidrachm.

SPIRITUS ÆTHERIS COMPOSITUS, N. F. IV. From U. S. P. VIII.

Sp. Æther. Co.

Compound Spirit of Ether, Hoffmann's Anodyne. Contains ether (32.5), ethereal oil (2.5), and alcohol (to make 100).

Average dose: 4 mls or 1 fluidrachm.

SPIRITUS ÆTHERIS NITROSI, U. S. P. IX.

Sp. Æth. Nitros.

Spirit of Nitrous Ether, Sweet Spirit of Nitre. An alcoholic solution of ethyl nitrite, containing from 3.5 to 4.5 per cent of $C_2H_5NO_2$.

Directions for making. Tests for identity and purity and a method of assay.

Average dose: 2 mils or 30 minims.

Preparations: U. S. P.—*Mistura Glycyrrhizæ Composita*.

N. F.—*Mistura Copaibæ*, *Mistura Copaibæ et Opii*.

SPIRITUS AMMONIÆ, U. S. P. VIII. Deleted.

SPIRITUS AMMONIÆ ANISATUS, N. F. IV. New. Sp. Ammon. Anis.

Anisated Spirit of Ammonia, *Liquor Ammonii Anisatus*, Anisated Solution of Ammonia. Contains anethol (3), ammonia water (20), and alcohol (to make 100).

Average dose: 1 mil or 15 minims.

SPIRITUS AMMONIÆ AROMATICUS, U. S. P. IX. Sp. Ammon. Arom.

Aromatic Spirit of Ammonia. A solution of ammonium carbonate (3.4) in a mixture of ammonia water (9), oil of lemon (1), oil of lavender (0.1), oil of myristica (0.1), alcohol (70), and water to (make 100). Specific gravity about 0.900 at 25°.

Average dose: 2 mils or 30 minims.

Preparations: U. S. P.—*Tinctura Guaiaci Ammoniata*, *Tinctura Valerianæ Ammoniata*.

N. F.—*Liquor Sodæ et Menthæ*, *Tinctura Kino et Opii Composita*.

SPIRITUS AMYGDALÆ AMARÆ, U. S. P. IX. Sp. Amygd. Amar.

Spirit of Bitter Almond. A solution of oil of bitter almond (1), in a mixture of alcohol (80), and distilled water (to make 100). This spirit is intended for medicinal use and must not be used for flavoring food.

Average dose: 0.5 mil or 8 minims.

Preparations: N. F.—*Elixir Anisi*, *Elixir Terpini Hydratis*, *Elixir Zinci Valeratis*.

SPIRITUS ANISI, U. S. P. IX. Sp. Anisi.

Spirit of Anise. A solution of oil of anise (10) in alcohol (to make 100).

Average dose: 2 mils or 30 minims.

SPIRITUS AROMATICUS, N. F. III. Deleted.

SPIRITUS AURANTII, N. F. III. Deleted.

SPIRITUS AURANTII COMPOSITUS, U. S. P. IX. Sp. Aurant. Co.

Compound Spirit of Orange. A solution of oil of orange (20), oil of lemon (5), oil of coriander (2), oil of anise (5) in alcohol (to make 100).

Preparations: U. S. P.—*Elixir Aromaticum* (which see).

N. F.—*Elixir Calcii Lactophosphatis*, *Elixir Ferri Quininae et Strychninae*, *Elixir Phosphori*, *Vinum Carnis et Ferri*.

SPIRITUS CAMPHORÆ, U. S. P. IX.

Sp. Camph.

Spirit of Camphor. Official in European pharmacopœias as Spiritus Camphoratus (E). Contains from 9.5 to 10.5 w/v per cent of camphor. Directions for making and a method of assay.

Average dose: 1 mil or 15 minims.

Preparations: N. F.—Lotio Ammoniacalis Camphorata, Mistura Opii et Chloroformi Composita, Mistura Opii et Rhei Composita, Tinctura Kino et Opii Composita, Tinctura Pectoralis.

SPIRITUS CARDAMOMI COMPOSITUS, N. F. III. Deleted.

The preparation now official is much stronger.

SPIRITUS CARDAMOMI COMPOSITUS, N. F. IV. New. Sp. Card. Co.

Compound Spirit of Cardamom. Contains oil of cardamom (10), oil of orange (10), oil of cinnamon (1), oil of clove (0.5), anethol. (0.5), oil of caraway (0.05), and alcohol (to make 100).

Preparations: N. F.—Elixir Cardamomi Compositum, Elixir Formatum Compositum, Elixir Gentianæ (which see), Elixir Glycero-phosphatum Compositum, Elixir Glycyrrhizæ Aquosum, Elixir Hypophosphitum, Liquor Pancreatini.

SPIRITUS CHLOROFORMI, U. S. P. IX.

Sp. Chlorof.

Spirit of Chloroform. A solution of chloroform (6) in alcohol (to make 100).

Average dose: 2 mils or 30 minims.

SPIRITUS CINNAMOMI, U. S. P. IX.

Sp. Cinnam.

Spirit of Cinnamon. A solution of oil of cinnamon (10) in alcohol (to make 100).

Average dose: 2 mils or 30 minims.

Preparations: U. S. P.—Syrupus Rhei.

N. F.—Syrupus Ipecacuanhæ et Opii.

SPIRITUS CURASSAO, N. F. III. Deleted.

SPIRITUS FRUMENTI, U. S. P. IX. Deleted.

SPIRITUS GAULTHERIÆ, U. S. P. IX. Deleted.

SPITITUS GLYCERYLIS NITRATIS, U. S. P. IX.

Sp. Glyceryl. Nit.

Spirit of Glyceryl Trinitrate, Spirit of Glonoin, Spirit of Nitroglycerin. An alcoholic solution containing from 1 to 1.1 per cent of $C_3H_5(NO_3)_3$. Great care must be exercised in dispensing, handling, packing, transporting, and storing this Spirit. Tests for identity and purity and a method of assay.

Average dose: 0.05 mil or 1 minim.

Preparation: N. F.—Pilulæ Nitroglycerini.

SPIRITUS JUNIPERI, U. S. P. IX.

Sp. Junip.

Spirit of Juniper. A solution of oil of juniper (5) in alcohol (to make 100).

Average dose: 2 mils or 30 minims.

SPITITUS JUNIPERI COMPOSITUS, U. S. P. Sp. Junip. Co.
Compound Spirit of Juniper. A solution of oil of juniper (0.4), oil of caraway (0.05), oil of fennel (0.05) in a mixture of alcohol (70), and water (to make 100).

Average dose: 10 mils or 2½ fluidrachms.

SPIRITUS LAVANDULÆ, U. S. P. Sp. Lavand.
Spirit of Lavender. A solution of oil of lavender (5) in alcohol (to make 100).

Average dose: 2 mils or 30 minims.

SPIRITUS LIMONIS, N. F. III. Deleted.

SPIRITUS MENTHÆ PIPERITÆ, U. S. P. IX. Sp. Menth. Pip.
Spirit of Peppermint, Essence of Peppermint. A solution of oil of peppermint (10) and the coloring principle contained in peppermint (1) in alcohol (to make 100).

Average dose: 2 mils or 30 minims.

Preparations: N. F.—Elixir Catharticum Compositum, Liquor Phosphori, Mistura Opii et Rhei Compositæ, Mistura Rhei Alkalina, Syrupus Ficorum Compositus.

SPIRITUS MENTHÆ VIRIDIS, U. S. P. IX. Sp. Menth. Vir.
Spirit of Spearmint. A solution of oil of spearmint (10) and the coloring principle of spearmint (1) in alcohol (to make 100).

Average dose: 2 mils or 30 minims.

SPIRITUS MYRCIÆ, N. F. III. See Spiritus Myrciæ Compositus, N. F. IV.

SPIRITUS MYRCIÆ COMPOSITUS, N. F. IV. Sp. Myrciæ Co.
Compound Spirit of Myrcia. Contains oil of myrcia (0.8), oil of sweet orange (0.05), oil of pimenta (0.05), alcohol (61), and water (to make 100).

SPIRITUS MYRISTICÆ, N. F. III. Deleted.

SPIRITUS ODORATUS, N. F. IV. Sp. Odorat.
Perfumed Spirit. Contains oil of bergamot (1.5), oil of lemon (0.8), oil of rosemary (0.7), oil of lavender (0.4), oil of orange flowers (0.4), acetic ether (0.2), water (12), and alcohol (to make 100).

SPIRITUS OLEI VOLATILIS, N. F. III. See Spiritus Oleorum Volatilum, N. F.

SPIRITUS OLEORUM VOLATILUM, N. F. IV.
Spirit of Volatile Oils. Contains the volatile oil (6.5) and alcohol (to make 100).

SPIRITUS OPHTHALMICUS, N. F. III. Deleted.

SPIRITUS PHOSPHORI, N. F. III. Deleted.

SPIRITUS SAPONATUS, N. F. III. Deleted.

SPIRITUS SINAPIS, N. F. IV.

Sp. Sinap.

Spirit of Mustard. Contains volatile oil of mustard (2) and alcohol (to make 100).

SPIRITUS VANILLINI COMPOSITUS, N. F. IV. New. Sp. Vanil. Co.

Compound Spirit of Vanillin. Contains vanillin (20), oil of orange (5), oil of cardamom (1), oil of cinnamon (0.5), and alcohol (to make 100).

Preparations: N. F.—Elixir Vanillini Compositum, Syrupus Ammonii Hypophosphitis.

SPIRITUS VINI GALlici, U. S. P. VIII. Deleted.**SPONGIA COMPRESSA, N. F. III. Deleted.****SPONGIA DECOLORATA, N. F. III. Deleted.****STAPHISAGRIA, U. S. P. IX.**

Staphisag.

Staphisagria, Stavesacre. The ripe seeds of *Delphinium staphisagria* Linné without admixture of more than 2 per cent of foreign vegetable matter.

Average dose: 0.06 gm. or 1 grain.

Preparation: U. S. P.—Fluidextractum Staphisagriæ.

STILI DILUBILES, N. F. IV.

Stil. Dilub.

Paste Pencils, Unna Pencils. A general formula with directions for making.

STILI ACIDI SALICYLICI DILUBILIS, N. F. IV.

Stil. Acid. Salicyl. Dilub.

Salicylic Acid Pencil. A mixture of salicylic acid (10), tragacanth (5), starch (30), white dextrin (35), sugar (20), and distilled water (to make from 40 to 45 pencils).

STILUS ACIDI SALICYLI DILUBILIS, N. F. III. See Stili Acidi Salicylici Dilubilis, N. F.**STILUS COCAINÆ DILUBILIS, N. F. III. Deleted.****STILLINGIA, U. S. P. IX.**

Stilling.

Stillingia, Queen's Root, Queen's Delight. The dried roots of *Stillingia sylvatica* Linné. Yields not more than 5 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparations: U. S. P.—Fluidextractum Stillingiæ.

N. F.—Fluidextractum Stillingiæ Compositum.

STRAMONIUM, U. S. P. IX.

Stramon.

Stramonium, Jamestown Weed, Jimson Weed. Official in European pharmacopœias as *Folium Stramonii* (E). The dried leaves of *Datura stramonium* Linné, or of *Datura tatula* Linné without admix-

ture of more than 10 per cent of stems or other foreign matter.
Yields not more than 20 per cent of ash.

Average dose: 0.06 gm. or 1 grain.

Preparations: U. S. P.—*Extractum Stramonii (Pilular)* (which see). *Extractum Stramonii (Powdered)*, *Tinctura Stramonii*.

N. F.—*Fluidextractum Stramonii*.

STRONTII BROMIDUM, U. S. P. IX.

Stront. Brom.

Strontium Bromide. Contains not less than 98 per cent of $\text{SrBr}_2 + 6\text{H}_2\text{O}$. Tests for identity and purity.

Average dose: 1 gm. or 15 grains.

STRONTII CARBONAS, N. F. IV. Part II.

Stront. Carb.

Strontium Carbonate. Contains when dried not less than 99 per cent of SrCO_3 . Tests and a method of assay.

Preparation: N. F.—Used in making: *Elixir Formatum Compositum*.

STRONTII IODIDUM, U. S. P. IX.

Stront. Iod.

Strontium Iodide. Contains not less than 99 per cent of $\text{SrI}_2 + 6\text{H}_2\text{O}$. Tests for identity and purity and a method of assay.

Average dose: 0.3 gm. or 5 grains.

STRONTII SALICYLAS, U. S. P. IX.

Stront. Salicyl.

Strontium Salicylate. Contains when dried not less than 99 per cent of $\text{Sr}(\text{C}_7\text{H}_4\text{O}_3)_2 + 2\text{H}_2\text{O}$. Tests for identity and purity and a method of assay.

Average dose: 1 gm. or 15 grains.

STROPHANTHINUM, U. S. P. IX.

Strophanthin.

Strophanthin. A glucoside or mixture of glucosides obtained from *strophanthus*. It should be tasted only in very diluted solution. Tests for identity and purity.

Average dose: Mouth, 0.001 gm. or $\frac{1}{80}$ grain; intravenous, 0.00075 gm. or $\frac{1}{160}$ grain.

STROPHANTHUS, U. S. P. IX.

Strophanth.

Strophanthus. Official in European pharmacopœias as *Semen Strophanthi* (E). The dried, ripe seeds of *Strophanthus Kombe* Oliver, or of *Strophanthus hispidus* De Candolle. Biological standard and method of assay. Yields not more than 5 per cent of ash.

Average dose: 0.06 gm. or 1 grain.

Preparation: U. S. P.—*Tinctura Strophanthi*.

STRYCHNINA, U. S. P. IX.

Strych.

Strychnine. Official in European pharmacopœias as *Strychninum* (E). An alkaloid $\text{C}_{21}\text{H}_{22}\text{O}_2\text{N}_2$, obtained from *nux vomica*, and also obtained from other seeds of the *Loganiaceæ*. Yields not more than 0.1 per cent of ash. Tests for identity and purity.

Average dose: 0.0015 gm. or $\frac{1}{40}$ grain.

Preparations: N. F.—Elixir Ferri Pyrophosphatis, Quininæ et Strychninæ, Elixir Glycerophosphatum Compositum, Elixir Pepsini, Bismuthi et Strychninæ, Liquor Hypophosphitum Compositus, Liquor Strychninæ Acetatis, Pilulæ Antidyspepticæ, Pilulæ Aloini, Strychninæ et Belladonnæ, Pilulæ Aloini, Strychninæ et Belladonnæ, Compositæ, Pilulæ Ferri, Quininæ, Strychninæ et Arsenici Fortiores, Pilulæ Ferri, Quininæ, Strychninæ et Arsenici Mites, Pilulæ Laxativæ Compositæ, Syrupus Ferri, Quininæ et Strychninæ Phosphatum, Syrupus Hypophosphitum Compositus.

STRYCHNINÆ GLYCEROPHOSPHAS, N. F. IV. Part II.

Strych. Glycerophos.

Strychnine Glycerophosphate, Strychnine Glycerinophosphate The glycerophosphate $(C_{21}H_{22}O_2N_2)_2PO_4H_2(C_3H_7O_2) + 6H_2O$ of the alkaloid strychnine. Tests for identity and purity.

Average dose: 0.0015 gm. or $\frac{1}{40}$ grain.

Preparation: N. F.—Elixir Glycerophosphatum Compositum.

STRYCHNINÆ NITRAS, U. S. P. IX.

Strych. Nit.

Strychnine Nitrate. Official in European pharmacopœias as Strychninum Nitricum (E). The nitrate $C_{21}H_{22}O_2N_2.HNO_3$ of the alkaloid strychnine. Tests for identity and purity.

Average dose: 0.0015 gm. or $\frac{1}{40}$ grain.

Preparations: N. F.—Syrupus Phosphatum cum Quininæ et Strychninæ.

STRYCHNINÆ SULPHAS, U. S. P. IX.

Strych. Sulph.

Strychnine Sulphate. Official in European pharmacopœias as Strychninum Sulfuricum (E). The sulphate $(C_{21}H_{22}O_2N_2)_2H_2SO_4 + 5H_2O$ of the alkaloid strychnine. Tests for identity and purity.

Average dose: 0.0015 gm. or $\frac{1}{40}$ grain.

Preparations: N. F.—Elixir Cinchonæ Alkaloidarum Ferri et Strychninæ, Elixir Cinchonæ Alkaloidarum Ferri, Bismuthi et Strychninæ, Elixir Ferri, Quininæ et Strychninæ, Elixir Quininæ Valeratis et Strychninæ.

STRYCHNINÆ VALERAS, N. F. IV. Part II.

Strych. Valer.

Strychninæ Valerate. The valerate $C_{21}H_{22}O_2N_2.HC_8H_7O_2$ of the alkaloid strychnine. Tests for identity and purity.

Average dose: 0.0015 gm. or $\frac{1}{40}$ grain.

Preparation: Elixir Strychninæ Valeratis.

STYRAX, U. S. P. IX.

Storax, Liquid Storax, Official in European pharmacopœias as Styra Liquidus (E), Balsam Styra Liquidus (S). A balsam obtained from the wood and inner bark of *Liquidambar orientalis* Miller. Tests for identity and a limited solubility. Acid value

should be from 56 to 85. Saponification value from 170 to 230. Yields not more than 1 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparation: U. S. P.—Tinctura Benzoini Composita.

SUCCUS CITRI, N. F. IV. Part II.

Suc. Cit.

Lime Juice. The expressed juice of the ripe fruit of *Citrus medica acida* Bonavia, containing from 5 to 10 w/v per cent of total acids, calculated as crystallized citric acid.

Preparation: N. F.—Succus Citri et Pepsinum.

SUCCUS CITRI ET PEPSINUM, N. F. IV.

Suc. Cit. et Pepsin.

Lime Juice and Pepsin, replacing Succus Limettæ cum Pepsino, N. F. III. A mixture of glycerite of pepsin (40) and lime juice (to make 100).

Average dose: 8 mils or 2 fluidrachms.

SUCCUS LIMETTÆ CUM PEPSINO, N. F. III. See Succus Citri et Pepsinum, N. F. IV.

SUCCUS POMORUM, N. F. IV. Part II.

Suc. Pomor.

Fresh Apple Juice. The freshly expressed juice of sound, ripe, sour apples, the fruit of cultivated varieties of *Pyrus malus* Linné.

Preparation: N. F.—Extractum Ferri Pomatum.

SULPHONETHYLMETHANUM, U. S. P. IX.

Sulphonethylmeth.

Sulphonethylmethane, Trional, Methyl Sulphonal. Official in European pharmacopœias as Trionalum (E). Diethylsulphonemethylethylmethane, $C_8H_{18}S_2O_4$. Should melt at from 74 to 76°. Decomposed at higher temperatures. Yields not more than 0.05 per cent of ash. Tests for identity and purity.

Average dose: 0.75 gm. or 12 grains.

SULPHONMETHANUM, U. S. P. IX.

Sulphonmeth.

Sulphonmethane, Sulphonal. Official in European pharmacopœias as Sulfonalum (E). Diethylsulphonedimethylmethane, $C_7H_{16}S_2O_4$. Tests for identity and purity. Melts between 124 and 126°.

Average dose: 0.75 gm. or 12 grains.

SULPHURIS IODIDUM, N. F. IV. From U. S. P. VIII. Sulphur Iod.

Sulphur Iodide. (Sulphuris Iodidum, U. S. P. VIII). A mixture of washed sulphur (20), and iodine (80) combined by means of heat. Tests for identity and purity and a method of assay.

SULPHUR LOTUM, U. S. P. IX.

Sulph. Lot.

Washed Sulphur. Official in European pharmacopœias as Sulfur Depuratum (E). When dried contains not less than 99.5 per cent of S. Directions for washing. Tests for identity and purity and a method of assay.

Average dose: 4 gm. or 1 drachm.

Preparations: U. S. P.—Pulvis Glycyrrhizæ Compositus.

N. F.—Sulphuris Iodidi, Trochisci Sulphuris et Potassii Bitartratis.

SULPHUR PRÆCIPITATUM, U. S. P. IX.

Sulph. Præc.

Precipitated Sulphur, Lac Sulphuris, Milk of Sulphur. Official in European pharmacopœias as Sulfur Præcipitatum (E). When dried to constant weight contains not less than 99.5 per cent of S. Tests for identity and purity and a method of assay.

Average dose: 4 gm. or 1 drachm.

Preparations: N. F.—Pasta Naphtholi, Lassar, Pasta Zinci Sulphurata.

SULPHUR SUBLIMATUM, U. S. P. IX.

Sulph. Sublim.

Sublimed Sulphur, Flowers of Sulphur. Official in European pharmacopœias as Sulfur Sublimatum (E). Contains when dried not less than 99.5 per cent of S. Tests for identity and purity and a method of assay.

Average dose: 4 gm. or 1 drachm.

Preparations: U. S. P.—Unguentum Sulphuris.

N. F.—Liquor Calcis Sulphuratæ, Petroxolinum Sulphuratum, Unguentum Sulphuris Alkalinum, Unguentum Sulphuris Compositum.

SUMBUL, U. S. P. IX.

Sumbul, Musk-Root. The rhizome and roots of *Ferula Sumbul* Hooker, filius.

Average dose: 2 gm. or 30 grains.

Preparations: U. S. P.—Extractum Sumbul, Fluidextractum Sumbul.

N. F.—Tinctura Sumbul.

SUPPOSITORIA, U. S. P. IX.

Suppositories. A general description with directions for making suppositories with oil of theobroma and with glycerinated gelatin.

SUPPOSITORIA BOROGLYCERINI, N. F. IV.

Suppos. Boroglycer.

Suppositories of Boroglycerin. A mixture of glycerinated gelatin (40), glycerite of boroglycerin (30), and glycerin (30) made into suppositories of suitable size.

SUPPOSITORIA GLYCERINI, U. S. P. IX.

Supp. Glycerin.

Suppositories of Glycerin. Each suppository contains glycerin (3) with a stearic acid soap.

SUPRARENALUM SICCUM, U. S. P. IX.

Supraren. Sicc.

Dried Suprarenals, Glandulæ Suprarenales Siccæ, U. S. P. VIII, Desiccated Suprarenal Glands. The suprarenal glands of animals which are used for food by man, cleaned, dried freed from fat and

powdered and containing from 0.4 to 0.6 per cent of epinephrine, the active principle of the suprarenal gland. One part of the dried suprarenals represents approximately 6 parts of fresh glands, free from fat. A biological and a chemical method of assay.

Average dose: 0.25 gm. or 4 grains.

SYRUP, N. F. IV.

Syrups. A general description with directions for keeping.

SYRUPUS, U. S. P. IX.

Syr.

Syrup, Sirup, Simple Syrup. Official in European pharmacopœias as *Sirupus Simplex* (E). A solution of sugar (85) in distilled water (to make 100).

Preparations: U. S. P.—Elixir Aromaticum, also in other preparations.

N. F.—Elixiria, Syrupi and other preparations.

SYRUPUS ACACIÆ, U. S. P. IX.

Syr. Acac.

Syrup of Acacia. A solution of acacia (10) and sugar (80) in distilled water (to make 100).

Preparation: N. F.—Syrupus Morphinæ et Acaciæ.

SYRUPUS ACIDI CITRICI, U. S. P. IX.

Syr. Acid. Cit.

Syrup of Citric Acid. Official in European pharmacopœias as *Sirupus Citri* (E). A solution of citric acid (1) and tincture of lemon peel (1) in syrup (to make 100).

Preparations: U. S. P.—Liquor Magnesii Citratis.

N. F.—Liquor Sodii Citro-Tartratis Effervescens, Liquor Magnesii Sulphatis Effervescens.

SYRUPUS ACIDI HYDRIODICI, U. S. P. IX.

Syr. Acid. Hydriod.

Syrup of Hydriodic Acid. Contains from 1.3 to 1.45 w/v per cent of HI. Directions for making. Tests for identity and purity and a method of assay.

Average dose: 4 mils or 1 fluidrachm.

SYRUPUS ACTÆÆ COMPOSITUS, N. F. III. See Syrupus Cimicifugæ Compositus, N. F. IV.

SYRUPUS ALLII, N. F. IV.

Syr. Allii.

Syrup of Garlic. Garlic (20) extracted with diluted acetic acid and mixed with sugar (to make 100).

Average dose: 4 mils or 1 fluidrachm.

SYRUPUS ALTHÆÆ, N. F. IV.

Syr. Althæ.

Syrup of Althæa, Syrup of Marshmallow. Althæa (5) extracted with a mixture of alcohol and water and the extract mixed with sugar and glycerin (to make 100).

Average dose: 4 mils or 1 fluidrachm.



SYRUPUS AMMONII HYPOPHOSPHITIS, N. F. IV.

Syr. Ammon. Hypophos.

Syrup of Ammonium Hypophosphite. A solution of ammonium hypophosphite (3.5) with diluted hypophosphorous acid (0.2) flavored with compound spirit of vanillin (0.2) and mixed with glycerin (10) and syrup (to make 100).

Average dose: 4 mils or 1 fluidrachm.

SYRUPUS AMYGDALÆ, U. S. P. VIII. Deleted.

SYRUPUS ASARI COMPOSITUS, N. F. IV.

Syr. Asar. Co.

Compound Syrup of Asarum (Compound Syrup of Canada Snake-root). Represents asarum (6.2), cochineal (0.15), potassium carbonate (0.25), fluidextract of ipecac (0.3), alcohol (20), with sugar and water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

SYRUPUS AURANTII, U. S. P. IX.

Syr. Aur.

Syrup of Orange. Official in European pharmacopœias as Sirupus Aurantii Corticis (E). A mixture of tincture of sweet orange peel (5), citric acid (0.5), and syrup (to make 100).

SYRUPUS AURANTII FLORUM, U. S. P. IX.

Syr. Aur. Flor.

Syrup of Orange Flowers. A solution of sugar (85) in orange flower water (to make 100).

SYRUPUS BROMIDORUM, N. F. IV.

Syr. Bromidor.

Syrup of the Bromides. A solution of potassium bromide (8), sodium bromide (8), ammonium bromide (5), calcium bromide (2.5), lithium bromide (0.8), in a mixture of tincture of vanilla (3.2), compound tincture of cudbear (1.6), compound syrup of sarsaparilla (45), and syrup (to make 100).

Average dose: 4 mils or 1 fluidrachm.

SYRUPUS CALCII CHLORHYDROPHOSPHATIS, N. F. III. See Syrupus Calcii Hydrochlorophosphatis, N. F. IV.

SYRUPUS CALCII ET SODII HYPOPHOSPHITUM, N. F. IV.

Syr. Calc. et Sod. Hypophos.

Syrup of Calcium and Sodium Hypophosphites. A solution of calcium hypophosphite (3.5), sodium hypophosphite (3.5), hypophosphorous acid (0.15), and sugar (77.5) in water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

SYRUPUS CALCII HYDROCHLOROOPHOSPHATIS, N. F. IV.

Syr. Calc. Hydrochlorophos.

Syrup of Calcium Hydrochlorophosphate, Syrupus Calcii Chlorhydrophosphatis, N. F. III. A solution of precipitated calcium phosphate (1.75) in water by means of hydrochloric acid mixed with tincture of lemon peel and syrup (to make 100).

Average dose: 4 mils or 1 fluidrachm.

SYRUPUS CALCII HYPOPHOSPHITIS, N. F. IV. Syr. Calc. Hypophos.

Syrup of Calcium Hypophosphite. A solution of Calcium Hypophosphite (3.5) with hypophosphorous acid (0.15) and sugar (to make 100).

Average dose: 4 mils or 1 fluidrachm.

SYRUPUS CALCII IODIDI, N. F. IV.

Syr. Calc. Iodid.

Syrup of Calcium Iodide. A solution of calcium iodide (8.5) in syrup (to make 100).

Average dose: 2 mils or 30 minims.

SYRUPUS CALCII LACTOPHOSPHATIS, U. S. P. IX.

Syr. Calc. Lactophos.

Syrup of Calcium Lactophosphate. A solution of precipitated calcium carbonate (2.5) in a mixture of lactic acid (6), phosphoric acid (3.6), stronger orange flower water (5), glycerin and syrup (to make 100).

Average dose: 10 mils or 2½ fluidrachms.

Preparation: N. F.—Syrupus Calcii Lactophosphatis et Ferri.

SYRUPUS CALCII LACTOPHOSPHATIS CUM FERRO, N. F. III. See

Syrupus Calcii Lactophosphatis et Ferri, N. F.

SYRUPUS CALCII LACTOPHOSPHATIS ET FERRI, N. F. IV.

Syr. Calc. Lactophos. et Ferr.

Syrup of Calcium Lactophosphate with Iron. A mixture of ferrous lactate (0.85), potassium citrate (0.85), and syrup of calcium lactophosphate (to make 100).

Average dose: 4 mils or 1 fluidrachm.

Preparation: N. F.—Elixir Cinchonæ Alkaloidarum, Ferri, et Calcii Lactophosphatis.

SYRUPUS CALCIS, U. S. P. VIII. Deleted.

SYRUPUS CHONDRI COMPOSITUS, N. F. III. Deleted.

SYRUPUS CIMICIFUGÆ COMPOSITUS, N. F. IV. Syr. Cimicif. Co.

Compound Syrup of Cimicifuga, Syrupus Actææ Compositus, N. F. III, Compound Syrup of Actæa. Represents fluidextract of cimicifuga (4), fluidextract of glycyrrhiza (2), fluidextract of senega (2), fluidextract of ipecac (1), wild cherry (4), with syrup (to make 100).

Average dose: 4 mils or 1 fluidrachm.

SYRUPUS CINNAMOMI, N. F. IV.

Syr. Cinnam.

Syrup of Cinnamon, Represents Saigon cinnamon (10), alcohol (5), with sugar and cinnamon water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

SYRUPUS CODEINÆ, N. F. IV.

Syr. Codein.

Syrup of Codeine. Now a solution of codeine sulphate (0.2), in syrup (to make 100).

Average dose: 4 mils or 1 fluidrachm.

SYRUPUS COFFŒÆ, N. F. III. Deleted.**SYRUPUS ERIODICTYI AROMATICUS, N. F. IV.**

Syr. Eriodict. Arom.

Aromatic Syrup of Eriodictyon, Aromatic Syrup of Yerba Santa, Syrupus Corrigens. Represents fluidextract of eriodictyon (3.2), solution of potassium hydroxide (2.5), compound tincture of cardamom (6.5), oil of sassafras (0.05), oil of lemon (0.05), oil of clove (0.1), and alcohol (3.2) with syrup (to make 100).

Average dose: 8 mils or 2 fluidrachms.

SYRUPUS FERRI ARSENATIS, N. F. III. Deleted.**SYRUPUS FERRI BROMIDI, N. F. III. Deleted.****SYRUPUS FERRI CITRO-IODIDI, N. F. III. Deleted.****SYRUPUS FERRI ET MANGANI IODIDI, N. F. IV.**

Syr. Ferr. et Mang. Iod.

Syrup of Iron and Manganese Iodide. Represents iron iodide (10) and manganese iodide (3.75) in syrup (to make 100).

Average dose: 1 mil or 15 minims.

SYRUPUS FERRI HYPOPHOSPHITIS, N. F. IV. Syr. Ferr. Hypophos.

Syrup of Ferric Hypophosphite. A solution of ferric hypophosphite (1.75) and potassium citrate (2.5) in orange flower water (9) and syrup (to make 100).

Average dose: 4 mils or 1 fluidrachm.

SYRUPUS FERRI IODIDI, U. S. P. IX.

Syr. Ferr. Iod.

Syrup of Ferrous Iodide. Official in European pharmacopœias as Syrupus Jodeti Ferrosi (S). Included in the International Protocol as Ferri Iodidi Sirupus (P. I.). Contains from 4.75 to 5.25 per cent of FeI_2 . Directions for making. Tests for purity and a method of assay.

Average dose: 1 mil or 15 minims.

SYRUPUS FERRI LACTOPHOSPHATIS, N. F. IV.

Syr. Ferr. Lactophos.

Syrup of Iron Lactophosphate. A solution of ferrous lactate (1.75) with phosphoric acid (1.75) in syrup (to make 100).

Average dose: 4 mils or 1 fluidrachm.

SYRUPUS FERRI PROTOCHLORIDI, N. F. IV. Syr. Ferr. Protochlor.

Syrup of Ferrous Chloride, Syrup of Protochloride of Iron. A mixture of solution of protochloride of iron (5), glycerin (12.5), orange flower water (12.5), and syrup (to make 100).

Average dose: 4 mils or 1 fluidrachm.

SYRUPUS FERRI QUININÆ ET STRYCHNINÆ PHOSPHATUM, N. F. IV.
 From U. S. P. VIII. Syr. Ferr. Quin. et Strych. Phos.

Syrup of the Phosphates of Iron, Quinine, and Strychnine. As modified, a solution of ferric phosphate (2), quinine (2.6), and strychnine (0.02) in a mixture of phosphoric acid (5), glycerin (10), water (5), and syrup (to make 100).

Average dose: 4 mils or 1 fluidrachm.

SYRUPUS FERRI SACCHARATI SOLUBILIS, N. F. IV.

Syr. Ferr. Sacch. Sol.

Syrup of Soluble Saccharated Iron, Syrupus Ferri Oxydati Solubilis, Syrup of Saccharated Oxide of Iron, Syrup of Soluble Oxide of Iron. A solution of saccharated ferric oxide (41.5) in a mixture of syrup and water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

SYRUPUS FICORUM COMPOSITUS, N. F. IV. New. Syr. Ficor. Co.

Compound Syrup of Figs. Represents figs (30), fluid extract of senna (20), aromatic fluidglycerate of cascara sagrada (10), oil of fennel (0.1), spirit of peppermint (0.3), and syrup (to make 100).

Average dose: 4 mils or 1 fluidrachm.

SYRUPUS GLYCYRRHIZÆ, N. F. IV.

Syr. Glycyrrhiz.

Syrup of Glycyrrhiza, Syrup of Licorice. Now a mixture of fluidglycerate of glycyrrhiza (25) and syrup (to make 100).

Average dose: 8 mils or 2 fluidrachms.

SYRUPUS HYDROCHLOROPHOSPHATUM, N. F. III. See Syrupus Phosphatum cum Quinina et Strychnina, N. F. IV.

SYRUPUS HYPOPHOSPHITUM, N. F. III. Deleted.

SYRUPUS HYPOPHOSPHITUM, U. S. P. IX.

Syr. Hypophos.

Syrup of Hypophosphites. A solution of calcium hypophosphite (4.5), potassium hypophosphite (1.5), sodium hypophosphite (1.5), in a mixture of diluted hypophosphorous acid (0.2), glycerin (5), and syrup (to make 100).

Average dose: 10 mils or 2½ fluidrachms.

SYRUPUS HYPOPHOSPHITUM COMPOSITUS, N. F. IV. From U. S. P. VIII.

Syr. Hypophos. Co.

Compound Syrup of Hypophosphites. As modified, a solution of calcium hypophosphite (3.5), potassium hypophosphite (1.75), sodium hypophosphite (1.75), ferric hypophosphite (0.225), manganese hypophosphite (0.225), quinine (0.11), strychnine (0.0115), sodium citrate (0.375), and diluted hypophosphorous acid (1.5) in glycerin (5), and syrup (to make 100).

Average dose: 8 mils or 2 fluidrachms.

SYRUPUS IODOTANNICUS, N. F. IV. New. Syr. Iodotan.

Syrup of Iodotannin. Represents iodine (0.27) and tannic acid (0.54) in syrup (to make 100).

Average dose: 4 mils or 1 fluidrachm.

SYRUPUS IPECACUANHÆ, U. S. P. IX. Syr. Ipecac.

Syrup of Ipecac. A mixture of fluidextract of ipecac (7), acetic acid (1), glycerin (10), and syrup (to make 100).

Average dose: Expectorant, 1 mil or 15 minims; emetic, 15 mils or 4 fluidrachms.

SYRUPUS IPECACUANHÆ ET OPII, N. F. IV. Syr. Ipecac. et Opii.

Syrup of Ipecac and Opium, Syrup of Dover's Powder. A mixture of tincture of ipecac and opium (8.5), spirit of cinnamon (0.4), cinnamon water (3.2), and syrup (to make 100).

Average dose: 4 mils or 1 fluidrachm.

SYRUPUS KRAMERLÆ, N. F. IV. From U. S. P. VIII. Syr. Kramer.

Syrup of Krameria. A mixture of fluidextract of krameria (45), with syrup (to make 100).

Average dose: 4 mils or 1 fluidrachm.

SYRUPUS LACTUCARII, U. S. P. IX. Syr. Lactucar.

Syrup of Lactucarium. A mixture of tincture of lactucarium (10), glycerin (20), citric acid (0.1), orange flower water (5), and syrup (to make 100).

Average dose: 10 mils or 2½ fluidrachms.

SYRUPUS MANNAE, N. F. IV. Syr. Mann.

Syrup of Manna. Represents manna (12.5), alcohol (6.5), and syrup (to make 100).

Average dose: 8 mils or 2 fluidrachms.

SYRUPUS MORPHINÆ COMPOSITUS, N. F. III. Deleted.

SYRUPUS MORPHINÆ ET ACACIÆ, N. F. IV. Syr. Morph. et Acac.

Syrup of Morphine and Acacia, Syrupus Pectoralis, N. F. III, Jackson's Pectoral Syrup. A solution of morphine hydrochloride (0.055) and oil of sassafras (0.05) in syrup of acacia (to make 100).

Average dose: 4 mils or 1 fluidrachm.

SYRUPUS MORPHINÆ SULPHATIS, N. F. III. Deleted.

SYRUPUS PAPAVERIS, N. F. IV. Syr. Papaver.

Syrup of Poppy Capsules. Now represents the water soluble constituents of poppy capsules (10) in syrup (to make 100).

Average dose: 4 mils or 1 fluidrachm.

SYRUPUS PECTORALIS, N. F. III. See Syrupus Morphinæ et Acaciæ, N. F. IV.

SYRUPUS PHOSPHATUM COMPOSITUS, N. F. IV. Syr. Phos. Co.

Compound Syrup of the Phosphates, Chemical Food. Now a mixture of compound solution of phosphates (50), glycerin (15), tincture of cudbear (1.6), and syrup (to make 100).

Average dose: 4 mils or 1 fluidrachm.

SYRUPUS PHOSPHATUM CUM QUININA ET STRYCHNINA, N. F. IV.

Syr. Phos. c. Quin. et Strych.

Syrup of Phosphates with Quinine and Strychnine, Syrupus Hydrochlorophosphatum, N. F. III, Compound Syrup of Hydrochlorophosphates. Now a solution of quinine hydrochloride (0.44), strychnine nitrate (0.014), in a mixture of compound solution of phosphates (50), glycerin (15), and syrup (to make 100).

Average dose: 4 mils or 1 fluidrachm.

SYRUPUS PICIS LIQUIDÆ, U. S. P. IX.

Syr. Pic. Liq.

Syrup of Tar. A solution of tar (0.5) mixed with syrup (to make 100).

Average dose: 4 mils or 1 fluidrachm.

SYRUPUS PINI STROBI COMPOSITUS, N. F. III. See Syrupus Pini Strobi Compositus cum Morphina, N. F. IV.

SYRUPUS PINI STROBI COMPOSITUS, N. F. IV. New.

Syr. Pin. Strob. Co.

Compound Syrup of White Pine. Represents white pine bark (8.5), wild cherry (8.5), Arabic (1), Balsam Poplar buds (1), sanguinaria (0.8) sassafras (0.7), cudbear (0.1), chloroform (0.6), oil of sassafras (0.02), glycerin (10), with alcohol and syrup (to make 100).

Average dose: 4 mils or 1 fluidrachm.

SYRUPUS PINI STROBI COMPOSITUS CUM MORPHINA, N. F. IV.

Syr. Pin. Strob. c. Morph.

Compound Syrup of White Pine with Morphine (Syrupus Pini Strobi Compositus, N. F. III). A solution of morphine sulphate (0.04) in compound syrup of white pine (to make 100).

Average dose: 2 mils or 30 minims.

SYRUPUS PRUNI VIRGINIANÆ, U. S. P. IX.

Syr. Prun. Virg.

Syrup of Wild Cherry. An aqueous extract of wild cherry bark (15), with glycerin (5), and syrup (to make 100).

Average dose: 4 mils or 1 fluidrachm.

SYRUPUS QUINIDINÆ, N. F. IV.

Syr. Quinid.

Syrup of Quinidine, Bitterless Syrup of Quinidine. Now a solution of quinidine (3.3), and oil of orange peel (0.02), in syrup (to make 100).

Average dose: 4 mils or 1 fluidrachm.

SYRUPUS RHAMNI CATHARTICÆ, N. F. IV. Syr. Rham. Cathart.

Syrup of Rhamnus Cathartica, Syrup of Buckthorn Berries, Syrupus Spinæ Cervinæ. A mixture of fluidextract of rhamnus catharticus (20), oil of fennel (0.2), oil of cinnamon (0.02), and syrup (to make 100).

Average dose: 8 mils or 2 fluidrachms.

SYRUPUS RHEI, U. S. P. IX. Syr. Rhei.

Syrup of Rhubarb. Official in European pharmacopœias as Sirupus Rhei (E). A mixture of fluidextract of rhubarb (10), spirit of cinnamon (0.4), potassium carbonate (1), and syrup (to make 100).

Average dose: 10 mils or 2½ fluidrachms.

SYRUPUS RHEI AROMATICUS, U. S. P. IX. Syr. Rhei Arom.

Aromatic Syrup of Rhubarb, Spiced Syrup of Rhubarb. A mixture of aromatic tincture of rhubarb (15), potassium carbonate (0.1), and syrup (to make 100).

Average dose: 10 mils or 2½ fluidrachms.

SYRUPUS RHEI ET POTASSII COMPOSITUS, N. F. III. See Mistura Rhei Alkalina, N. F. IV.

SYRUPUS ROSÆ, N. F. IV. From U. S. P. VIII. Syr. Ros.

Syrup of Rose. A mixture of fluidextract of rose (12.5), diluted sulphuric acid (1) and syrup (to make 100).

SYRUPUS RUBI, N. F. IV. From U. S. P. VIII. Syr. Rubi.

Syrup of Rubus, Syrup of Blackberry. A mixture of fluidextract of rubus (25), with syrup (to make 100).

Average dose: 4 mils or 1 fluidrachm.

Preparation: N. F.—Elixir Rubi Compositum.

SYRUPUS RUBI AROMATICUS, N. F. III. Deleted.

SYRUPUS RUBI FRUCTUS, N. F. IV. New. Syr. Rubi Fruct.

Syrup of Blackberry Fruit. The juice of ripe blackberries mixed with sufficient sugar (to make a syrup).

SYRUPUS RUBI IDÆI, N. F. IV. Syr. Rubi Id.

Syrup of Raspberry. A syrup made by adding a sufficient quantity of sugar to the clear juice of fresh ripe raspberries.

SYRUPUS SANGUINARIÆ, N. F. IV. Syr. Sanguinar.

Syrup of Sanguinaria, Syrup of Bloodroot. Represents sanguinaria (22.5), acetic acid (12.5), with syrup (to make 100).

Average dose: 2 mils or 30 minims.

SYRUPUS SARSAPARILLÆ COMPOSITUS, U. S. P. IX.

Syr. Sarsap. Co.

Compound Syrup of Sarsaparilla. A mixture of fluidextract of sarsaparilla (20), fluidextract of glycyrrhiza (1.5), fluidextract of

senna (Alexandria) (1.5), oil of sassafras (0.02), oil of anise (0.02), methyl salicylate (0.02), alcohol (1.94), and syrup (to make 100).

Average dose: 15 mils or 4 fluidrachms.

SYRUPUS SCILLÆ, U. S. P. IX.

Syr. Scill.

Syrup of Squill. A mixture of vinegar of squill (45), with sugar (80), and water (to make 100).

Average dose: 2 mils or 30 minims.

SYRUPUS SCILLÆ COMPOSITUS, U. S. P. IX.

Syr. Scill. Co.

Compound Syrup of Squill, Hive Syrup. A mixture of fluid-extract of squill (8), fluidextract of senega (8), antimony and potassium tartrate (0.2), and syrup (to make 100).

Average dose: 2 mils or 30 minims.

SYRUPUS SENEGÆ, U. S. P. IX.

Syr. Seneg.

Syrup of Senega. Official in European pharmacopœias as Sirupus Senegæ (E). A mixture of fluidextract of senega (20) and syrup (to make 100).

Average dose: 4 mils or 1 fluidrachm.

SYRUPUS SENNÆ, U. S. P. IX.

Syr. Senn.

Syrup of Senna. Official in European pharmacopœias as Sirupus Sennæ (E). A mixture of fluidextract of senna (25), oil of coriander (0.5), and syrup (to make 100).

Average dose: 4 mils or 1 fluidrachm.

SYRUPUS SENNÆ AROMATICUS, N. F. IV.

Syr. Senn. Arom.

Aromatic Syrup of Senna. Represents fluidextract of senna (12.5), jalap (5), rhubarb (1.75), Saigon cinnamon (0.4), clove (0.4), myristica (0.2), and oil of lemon (0.15) with diluted alcohol and sugar (to make 100).

Average dose: 8 mils or 2 fluidrachms.

SYRUPUS SENNÆ COMPOSITUS, N. F. IV.

Syr. Senn. Co.

Compound Syrup of Senna. A mixture of fluidextract of senna (13.5), fluidextract of rhubarb (3.5), fluidextract of frangula (3.5), methyl salicylate (0.4), alcohol (6.5), and syrup (to make 100).

Average dose: 8 mils or 2 fluidrachms.

SYRUPUS SODII HYPOPHOSPHITIS, N. F. IV.

Syr. Hypophos.

Syrup of Sodium Hypophosphite. A solution of sodium hypophosphite (3.5) in hypophosphorous acid (0.2) and syrup (to make 100).

Average dose: 4 mils or 1 fluidrachm.

SYRUPUS STILLINGIÆ COMPOSITUS, N. F. IV.

Syr. Stilling. Co.

Compound Syrup of Stillingia. Now a mixture of compound fluid-extract of stillingia (25), glycerin (10), and syrup (to make 100).

Average dose: 4 mils or 1 fluidrachm.

SYRUPUS TOLUTANUS, U. S. P. IX.

Syr. Tolu.

Syrup of Tolu. The water-soluble constituents of tincture of tolu (5) with syrup (to make 100).

Average dose: 15 mils or 4 fluidrachms.

Preparations: U. S. P.—Trochisci Ammonii Chloridi, Trochisci Cubebæ.

N. F.—Emulsum Olei Morrhuæ cum Calcii Lactophosphate, Emulsum Olei Morrhuæ cum Calcii Phosphate, Emulsum Olei Morrhuæ cum Pruno Virginiana, Emulsum Olei Morrhuæ cum Vitello, Mistura Pectoralis, Stokes.

SYRUPUS ZINGIBERIS, U. S. P. IX.

Syr. Zingib.

Syrup of Ginger. A mixture of fluidextract of ginger (3), alcohol (2), and syrup (to make 100).

Average dose: 15 mils or 4 fluidrachms.

TALCUM, U. S. P. VIII. Deleted.

TALCUM PURIFICATUM, U. S. P. IX.

Talc. Purif.

Purified Talc. A purified native, hydrous magnesium silicate sometimes containing a small amount of aluminum silicate. Tests for identity and purity.

Preparations: N. F.—Pulvis Talci-compositus. Used in making: Elixir Potassii Acetatis et Juniperi, Glyceritum Pepsini, Liquor Pepsini Antisepticus, Liquor Pepsini Aromaticus, Syrupus Chondri Compositus, Syrupus Cimicifugæ Compositus, Vinum Pruni Virginianæ.

TAMARINDUS, N. F. IV. Part II. From U. S. P. VIII. Tamarind.

Tamarind. The preserved pulp of the fruit of *Tamarindus indica* Linné.

Average dose: 15 gm. or 4 drachms.

Preparation: N. F.—Confectio Sennæ.

TARAXACUM, U. S. P. IX.

Tarax.

Taraxacum, Dandelion. Official in European pharmacopœias as Radix Taraxaci (E). The dried rhizome and roots of *Taraxacum officinale* Weber. Yields not more than 10 per cent of ash.

Average dose: 10 gm. or 2½ drachms.

Preparations: U. S. P. Extractum Taraxaci, Fluidextractum Taraxaci (which see).

TEREBENUM, U. S. P. IX.

Tereben.

Terebene. A liquid consisting of dipentene and other hydrocarbons obtained by the action of concentrated sulphuric acid on oil of turpentine. Tests for identity and purity.

Average dose: 0.25 mil or 4 minims.

TEREBINTHINÆ, N. F. IV. Part II. From U. S. P. VIII.

Terebinth.

Turpentine. A concrete oleoresin obtained from *Pinus palustris* Miller and from other species of *Pinus*.

Preparation: N. F.—Ceratum Resinæ Compositum.

TEREBINTHINÆ CANADENSIS, U. S. P. VIII. Deleted.

TEREBINTHINA LARICIS, N. F. IV. Part II. Terebinth. Laric.

Venice Turpentine, Larch Turpentine. A viscid oleoresin obtained from *Larix europea* De Candolle.

Preparation: N. F.—Petroxolinum Terebinthinæ Venetæ.

TERPINI HYDRAS, U. S. P. IX. Terpin. Hyd.

Terpin Hydrate. Official in European pharmacopœias as Terpinum Hydratum (E), Hydras Terpicus (S). The hydrate $C_{10}H_{18}(OH)_2 + H_2O$ of the dihydroxyalcohol terpin. Tests for identity and purity.

Average dose: 0.25 gm. or 4 grains.

Preparation: N. F.—Elixir Terpini Hydratis.

TERRA SILICEA PURIFICATA, U. S. P. IX. New. Ter. Sil. Purif.

Purified Siliceous Earth. Purified Kieselguhr, Purified Infusorial Earth. A form of silica SiO_2 , consisting of the frustules and fragments of diatoms, purified by boiling with diluted hydrochloric acid, washing, and calcining. It does not contain more than 10 per cent of moisture. Tests for identity and purity. Used as a filtering medium.

Preparation: N. F.—Pasta Zinci Sulphurata.

THEOBROMINÆ SODIO-SALICYLAS, U. S. P. IX. New.

Theobrom. Sodio-Salicyl.

Theobromine Sodio-Salicylate. Also sold under the trade name Diuretin. Official in European pharmacopœias as Theobromino Natrium Salicylicum (E), Salicylas Natrico Theobromicus (S). Sodium theobromine $C_7H_7O_2N_4Na$ and sodium salicylate $NaC_7H_5O_3$ in approximately molecular proportions. Yields when dried not less than 46.5 per cent of theobromine.

Average dose: 1 gm. or 15 grains.

THEOPHYLLINA, U. S. P. IX. New.

Theophyll.

Theophylline, Dimethylxanthine. An organic base $C_7H_7O_2N_4 + H_2O$ isomeric with theobromine. Tests for identity and purity.

Average dose: 0.25 gm. or 4 grains.

THUJA, N. F. IV. Part II.

Thuja.

Thuja, Arbor Vitæ. The recently dried young twigs of *Thuja occidentalis* Linné, without admixture of more than 1 per cent of foreign substances. Yields not more than 7 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparation: N. F.—Fluidextractum Thujæ.

THYMOL, U. S. P. IX.

Thymol. A phenol $C_{10}H_{14}O$ occurring in the volatile oil of *Thymus vulgaris* Linné and in some other volatile oils. Tests for identity and purity.

Average does: Antiseptic, 0.125 gm. or 2 grains; anthelmintic, 1 gm. or 15 grains per day.

Preparations: N. F.—Liquor Antisepticus, Liquor Antisepticus Alkalinus, Nebula Aromatica, Nebula Thymolis.

THYMOLIS IODIDUM, U. S. P. IX.

Thymol. Iod.

Thymol Iodide. Official in European pharmacopœias as Aristolum (E). Chiefly dithymol-diiodide $C_{20}H_{24}O_2I_2$. Contains when dried not less than 43 per cent of iodine. Tests for identity and purity and a method of assay.

THYMUS, N. F. IV. Part II.

Thyme. The dried tops of *Thymus vulgaris* Linné, collected when the plant is in flower. Yields not more than 14 per cent of ash.

Average dose: 4 gm. or 1 drachm.

Preparation: N. F.—Fluidextractum Thymi.

THYROIDEUM SICCUM, U. S. P. IX.

Thyroid. Sicc.

Dried Thyroids, Glandulæ Thyroideæ Siccæ, U. S. P. VIII. Desiccated Thyroid Glands. The thyroid glands of animals which are used for food by man, freed from connective tissue, dried and powdered and containing from 0.17 to 0.23 per cent of iodine in thyroid combination. One part of dried thyroids corresponds to approximately 5 parts of the fresh glands. Yields not more than 5 per cent of ash.

Average dose: 0.1 gm. or 1½ grains.

TINCTURÆ, U. S. P. IX.

A general description of and formulas for tinctures. Tinctures are alcoholic preparations made by extracting valuable principles from drugs by the use of appropriate menstrua or solvents. Tincture of Ferric Chloride and Tincture of Iodine are exceptional, not being made by extraction; they are alcoholic solutions of chemical substances.

TINCTURÆ, N. F. III. General heading deleted.

TINCTURA ACONITI, U. S. P. IX.

Tr. Aconit.

Tincture of Aconite. Included in the International Protocol as Aconiti Tinctura (P. I.). Yields from 0.045 to 0.055 w/v per cent of the ether soluble alkaloids of aconite. Made by extracting aconite (10) with a mixture of alcohol (70) and water (to make 100).

Method of assay and an alternative biological method of assay.

Average dose: 0.3 mill or 5 minims.

TINCTURA ACONITI, Fleming, N. F. III. Deleted.

TINCTURA ALOES, U. S. P. IX. Tr. Aloes.

Tincture of Aloes. Made by extracting a mixture of aloes (10), and glycyrrhiza (20), with diluted alcohol (to make 100).

Average dose: 2 mils or 30 minims.

TINCTURA ALOES ET MYRRHÆ, N. F. IV. From U. S. P. VIII.

Tr. Aloe. et Myrrh.

Tincture of Aloes and Myrrh. Represents aloes (10), myrrh (10), glycyrrhiza (10), alcohol (75), and water (to make 100).

Average dose: 2 mils or 30 minims.

TINCTURA AMARA, N. F. IV. Tr. Amar.

Bitter Tincture, Stomachic Tincture, Bitter Stomachic Drops, Stomach Drops. Now represents gentian (6), centaury (6), bitter orange peel (6), zedoary (2), alcohol (65), and water (to make 100).

Average dose: 2 mils or 30 minims.

TINCTURA ANTAORIDA, N. F. III. Deleted.

TINCTURA ANTIPERIODICA, N. F. III. See *Tinctura Antiperiodica sine Aloe*, N. F.

TINCTURA ANTIPERIODICA, N. F. IV. Tr. Antiperiod.

Antiperiodic Tincture, Warburg's Tincture. Now represents rhubarb (0.8), angelica fruit (0.8), inula, (0.4), saffron (0.4), fennel (0.4), gentian (0.2), zedoary (0.2), cubeb (0.2), myrrh (0.2), camphor (0.2), agaric (0.2), pepper (0.035), saigon cinnamon (0.075), ginger (0.075), quinine bisulphate (2), extract of aloes (1.75), alcohol (60), and water (to make 100).

Average dose: 4 mils or 1 fluidrachm to 15 mils or 4 fluidrachms.

TINCTURA ANTIPERIODICA SINE ALOE, N. F. IV.

Tr. Antiperiod. s. Aloe.

Antiperiodic Tincture without Aloes, Warburg's Tincture without Aloes: Represents rhubarb (0.8), angelica seed (0.8), inula (0.4), saffron (0.4), fennel (0.4), gentian (0.2), zedoary (0.2), cubeb (0.2), myrrh (0.2), camphor (0.2), white agaric (0.2), black pepper (0.035), saigon cinnamon (0.075), ginger (0.075), quinine bisulphate (2), alcohol (60), and water (to make 100).

Average dose: 4 mils or 1 fluidrachm to 15 mils or 4 fluidrachms.

TINCTURA ARNICÆ, U. S. P. IX. Tr. Arnic.

Tincture of Arnica. Made by extracting arnica (20), with diluted alcohol (to make 100).

Average dose: 1 mil or 15 minims.

TINCTURA ARNICÆ RADICIS, N. F. III. Deleted.

TINCTURA AROMATICA, N. F. IV.**Tr. Arom.**

Aromatic Tincture. Now represents saigon cinnamon (10), Jamaica ginger (4), galangal (2), clove (2), cardamom seed (2), alcohol (65), and water (to make 100).

Average dose: 2 mils or 30 minims.

TINCTURA ASAFŒTIDÆ, U. S. P. IX.**Tr. Asafœt.**

Tincture of Asafetida. Official in European pharmacopœias as *Tinctura Asæ Fœtidæ* (E). Made by extracting asafetida (20) with alcohol (to make 100).

Average dose: 1 mil or 15 minims.

Preparation: N. F.—*Mistura Magnesiæ, Asafœtidæ et Opii*.

TINCTURA AURANTII AMARI, U. S. P. IX.**Tr. Aurant. Amar.**

Tincture of Bitter Orange Peel. Made by extracting bitter orange peel (20), with a mixture of alcohol (60) and water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

Preparation: N. F.—*Elixir Aurantii Amari*.

TINCTURA AURANTII DULCIS, U. S. P. IX.**Tr. Aurant. Dulc.**

Tincture of Sweet Orange Peel. Made by extracting sweet orange peel (50) with alcohol (to make 100).

Average dose: 4 mils or 1 fluidrachm.

Preparation: U. S. P.—*Syrupus Aurantii*.

TINCTURA BELLADONNÆ FOLIORUM, U. S. P. IX.**Tr. Bellad. Fol.**

Tincture of Belladonna Leaves. Included in the International Protocol as *Belladonnæ Tinctura* (P. I.) and official in European pharmacopœias as *Tinctura Belladonnæ* (E). Yields from 0.027 to 0.033 w/v per cent of the total alkaloids of belladonna leaves. Made by extracting belladonna leaves (10) with diluted alcohol (to make 100). Method of assay.

Average dose: 0.75 mil or 12 minims.

TINCTURA BENZOINI, U. S. P. IX.**Tr. Benz.**

Tincture of Benzoin. Made by extracting benzoin (20) with alcohol (to make 100).

Average dose: 1 mil or 15 minims.

Preparation: N. F.—*Unguentum Picis Compositum*.

TINCTURA BENZOINI COMPOSITA, U. S. P. IX.**Tr. Benz. Co.**

Compound Tincture of Benzoin. Made by extracting a mixture of benzoin (10), aloes (2), storax (8), and balsam of tolu (4) with alcohol (to make 100).

Average dose: 2 mils or 30 minims

TINCTURA BRYONIÆ, N. F. IV.**Tr. Bryon.**

Tincture of Bryonia. Represents bryonia (10) and alcohol (to make 100).

Average dose: 4 mils or 1 fluidrachm.

TINCTURA CACTI GRANDIFLORI, N. F. IV. New. Tr. Cact. Grand.
Tincture of Cactus Grandiflorus, Tincture of Night Blooming
Cereus. Represents cactus grandiflorus (50) and alcohol (to make
100).

Average dose: 1 mil or 15 minims.

TINCTURA CALENDULÆ, N. F. IV. From U. S. P. VIII. Tr. Calend.
Tincture of Calendula. Represents calendula (20) and alcohol
(to make 100).

TINCTURA CALUMBÆ, U. S. P. IX. Tr. Calumb.
Tincture of Calumba. Made by extracting calumba (20) with
a mixture of alcohol (60) and water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

TINCTURA CANNABIS, U. S. P. IX. Tr. Cannab.
Tincture of Cannabis, Tinctura Cannabis Indicæ, U. S. P. VIII.
Produces incoördination when administered to dogs in a dose of not
more than 0.3 mil per kilogramme of body weight. Made by ex-
tracting cannabis (10) with alcohol (to make 100). Biological
method of assay.

Average dose: 0.75 mil or 12 minims.

Preparations: N. F.—Mistura Chloroformi et Morphinæ Composita.

TINCTURA CANNABIS INDICÆ, U. S. P. VIII. See Tinctura Cannabis,
U. S. P. IX.

TINCTURA CANTHARIDIS, U. S. P. IX. Tr. Canthar.
Tincture of Cantharides. Included in the International Protocol
as Cantharidis Tinctura (P. I.). Made by extracting cantharides
(10) with alcohol (to make 100).

Average dose: 0.1 mil or 1½ minims.

TINCTURA CAPSICI, U. S. P. IX. Tr. Capsic.
Tincture of Capsicum. Made by extracting capsicum (10) with a
mixture of alcohol (95) and water (to make 100).

Average dose: 0.5 mil or 8 minims.

Preparations: N. F.—Mistura Chloroformi et Morphinæ Com-
posita, Mistura Opii et Chloroformi Composita, Mistura Opii et
Rhei Composita.

TINCTURA CAPSICI ET MYRRHÆ, N. F. IV. Tr. Capsic. et Myrrh.
Tincture of Capsicum and Myrrh, Hot Drops, Thomsonian Number
Six. Now represents capsicum (3), myrrh (12), alcohol (90), and
water (to make 100).

Average dose: 2 mils or 30 minims.

TINCTURA CARAMELLIS, N. F. IV. New. Tr. Caram.
Tincture of Caramel. A mixture of caramel (10), alcohol (25), and
water (to make 100).

Preparation: N. F.—Used for coloring.

TINCTURA CARDAMOMI, U. S. P. IX. **Tr. Cardam.**

Tincture of Cardamom. Made by extracting cardamom seed (15) with diluted alcohol (to make 100).

Average dose: 2 mils or 30 minims.

Preparation: N. F.—*Vinum Rhei Compositum*.

TINCTURA CARDAMOMI COMPOSITA, U. S. P. IX. **Tr. Cardam. Co.**

Compound Tincture of Cardamom. Made by extracting a mixture of cardamom seed (2), saigon cinnamon (2.5), caraway (1.2), and cochineal (0.5) with a mixture of glycerin (5) and diluted alcohol (to make 100).

Average dose: 4 mils or 1 fluidrachm.

Preparations: N. F.—*Elixir Gentianæ Glycerinatum*, *Elixir Taraxaci Compositum*, *Elixir Viburni Prunifolii*, *Gargarisma Guaiaci Composita*, *Liquor Strychninæ Acetatis*, *Syrupus Eriodictyi Aromaticus*.

TINCTURA CHIRATÆ, N. F. III. Deleted.

TINCTURA CIMICIFUGÆ, N. F. IV. From U. S. P. VIII.

Tr. Cimicif.

Tincture of Cimicifuga. Represents cimicifuga (20) and alcohol (to make 100).

Average dose: 4 mils or 1 fluidrachm.

TINCTURA CINCHONÆ, U. S. P. IX. **Tr. Cinch.**

Tincture of Cinchona. Official in European pharmacopœias as *Tinctura Chinæ* (E). Yields from 0.8 to 1.0 w/v per cent of the total alkaloids of cinchona. Made by extracting cinchona (20) with a mixture of glycerin and water (to make 100). Method of assay.

Average dose: 4 mils or 1 fluidrachm.

TINCTURA CINCHONÆ COMPOSITA, U. S. P. IX. **Tr. Cinch. Co.**

Compound Tincture of Cinchona. Official in European pharmacopœias as *Tinctura Chinæ Composita* (E). Yields from 0.4 to 0.5 w/v per cent of the total alkaloids of cinchona. Made by extracting red cinchona (10), bitter orange peel (8), and serpentaria (2) with a mixture of glycerin (7.5), alcohol (67.5), and water (to make 100). Method of assay.

Average dose: 4 mils or 1 fluidrachm.

TINCTURA CINCHONÆ DETANNATA, N. F. III. Deleted.

TINCTURA CINNAMOMI, U. S. P. IX. **Tr. Cinnam.**

Tincture of Cinnamon. Made by extracting saigon cinnamon (20) with a mixture of glycerin (7.5) and water (to make 100).

Average dose: 2 mils or 30 minims.

Preparations: N. F.—*Elixir Taraxaci Compositum*, *Mistura Rhei Alkalina*.

TINCTURA COCCULI INDICI, N. F. IV. New. Tr. Coccul. Ind.

Tincture of *Cocculus Indicus*, Tincture of Fish Berry. Represents *cocculus indicus* (10) and diluted alcohol (to make 100).

NOTE: Used externally to destroy vermin.

TINCTURA COLCHICI SEMINIS, U. S. P. IX. Tr. Colch. Sem.

Tincture of *Colchicum Seed*. Included in the International Protocol as *Colchici Tinctura* (P. I.). Yields from 0.036 to 0.044 w/v per cent of colchicine. Made by extracting colchicum seed (10) with a mixture of alcohol (60) and water (to make 100). Method of assay.

Average dose: 2 mils or 30 minims.

TINCTURA CONII, N. F. III. Deleted.

TINCTURA COTO, N. F. III. See Tincture Para Coto, N. F. IV.

TINCTURA CRESOLI SAPONATA, N. F. III. Deleted.

TINCTURA CROCI, N. F. IV. Tr. Croc.

Tincture of Saffron. Represents saffron (10) and diluted alcohol (to make 100).

TINCTURA CUBEBAE, N. F. IV. Tr. Cubeb.

Tincture of Cubeb. Represents cubeb (20) and alcohol (to make 100).

Average dose: 4 mils or 1 fluidrachm.

TINCTURA DELPHINII, N. F. IV. New. Tr. Delphin.

Tincture of Larkspur. Represents larkspur seed (10) and alcohol (to make 100).

NOTE: Commonly employed externally to destroy parasites.

TINCTURA DIGITALIS, U. S. P. IX. Tr. Digit.

Tincture of *Digitalis*. Included in the International Protocol as *Digitalis Tinctura* (P. I.). The minimum lethal dose should not be greater than 0.006 mil of the tincture for each gramme of body weight of frog. Made by extracting digitalis (10) with a mixture of alcohol (75) and water (to make 100). Biological method of assay.

Average dose: 0.5 mil or 8 minims.

TINCTURA ERGOTÆ AMMONIATA, N. F. IV. New.

Tr. Ergot. Ammon.

Ammoniated Tincture of Ergot. Represents ergot (25), ammonia water (10), alcohol (60), and water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

TINCTURA FERRI CHLORIDI, U. S. P. IX. Tr. Ferr. Chlor.

Tincture of Ferric Chloride. Official in European pharmacopœias as *Solutio Chloreti Ferrici Spirituosa* (S). Contains Ferric chloride (about 13 per cent) corresponding to not less than 4.48 per cent of Fe.

Made by mixing a solution of ferric chloride (35) with alcohol (to make 100). Tests for identity and purity and a method of assay.

Average dose: 0.5 mil or 8 minims.

Preparation: U. S. P.—Liquor Ferri et Ammonii Acetatis.

TINCTURA FERRI CHLORIDI ÆTHEREA, N. F. IV.

Tr. Ferr. Chlor. Æth.

Ethereal Tincture of Ferric Chloride, Bestuscheff's Tincture, Lamotte's Drops. Represents solution of ferric chloride (5.9), ether (25), and alcohol (to make 100).

Average dose: 2 mils or 30 minims.

TINCTURA FERRI CITRO-CHLORIDI, N. F. IV. Tr. Ferr. Citro-Chlor.

Tincture of Ferric Citro-Chloride, Tasteless Tincture of Ferric Chloride, Tasteless Tincture of Iron. A mixture of solution of ferric chloride (35), sodium citrate (50), alcohol (15), and water (to make 100), allowed to stand to separate excess of saline matter and filtered.

Average dose: 0.5 mil or 8 minims.

Preparations: N. F.—Elixir Ferri, Quininæ et Strychninæ, Elixir Gentianæ cum Tinctura Ferri Chloridi, Elixir Pepsini et Ferri, Liquor Ferri Salicylatis, Vinum Pruni Virginianæ Ferratum.

TINCTURA FERRI POMATA, N. F. IV.

Tr. Ferr. Pomat.

Tincture of Ferrated Extract of Apples, Tinctura Ferri, Malatis Crudi, Tincture of Crude Malate of Iron. Represents ferrated extract of apples (10), alcohol (10), and cinnamon water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

TINCTURA GALLÆ, N. F. IV. From U. S. P. VIII.

Tr. Gall.

Tincture of Nutgall. Represents nutgall (20), glycerin (10), and alcohol (90).

Average dose: 4 mils or 1 fluidrachm.

TINCTURA GAMBIR COMPOSITA, U. S. P. IX.

Tr. Gambir. Co.

Compound Tincture of Gambir, Compound Tincture of Pale Catechu. Made by extracting a mixture of gambir (5), and Saigon cinnamon (2.5) with diluted alcohol (to make 100).

Average dose: 4 mils or 1 fluidrachm.

Preparation: N. F.—Tinctura Pectoralis.

TINCTURA GELSEMI, U. S. P. IX.

Tr. Gelsem.

Tincture of Gelsemium. Made by extracting gelsemium (10) with a mixture of alcohol (65) and water (to make 100).

Average dose: 0.25 mil or 4 minims.

TINCTURA GENTIANÆ COMPOSITA, U. S. P. IX.

Tr. Gentian. Co.

Compound Tincture of Gentian. Made by extracting a mixture of gentian (10), bitter orange peel (4), and cardamom seed (1) with a mixture of glycerin (10), alcohol (50), and water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

TINCTURA GUAIACI, U. S. P. IX.

Tr. Guaiac.

Tincture of Guaiac. Made by extracting guaiac (20) with alcohol (to make 100).

Average dose: 4 mils or 1 fluidrachm.

Preparation: N. F.—Mistura Guaiaci.

TINCTURA GUAIACI AMMONIATA, U. S. P. IX. Tr. Guaiac. Ammon.

Ammoniated Tincture of Guaiac. Made by extracting guaiac (20) with aromatic spirit of ammonia (to make 100).

Average dose: 2 mils or 30 minims.

Preparation: N. F.—Gargarisma Guaiaci Composita.

TINCTURA GUAIACI COMPOSITA, N. F. IV.

Tr. Guaiac Co.

Compound Tincture of Guaiac, Dewees' Tincture of Guaiac. Represents guaiac (12.5), potassium carbonate (0.6), pimenta (3.2), alcohol (43.5), water (43.5), and diluted alcohol (to make 100).

Average dose: 4 mils or 1 fluidrachm.

TINCTURA HUMULI, N. F. IV.

Tr. Humul.

Tincture of Hops, Tincture of Humulus. Represents hops (20) and diluted alcohol (to make 100).

Average dose: 4 mils or 1 fluidrachm.

TINCTURA HYDRASTIS, U. S. P. IX.

Tr. Hydrast.

Tincture of Hydrastis, Tincture of Golden Seal. Yields from 0.36 to 0.44 w/v per cent of the ether soluble alkaloids of hydrastis. Made by extracting hydrastis (20) with a mixture of alcohol (66) and water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

TINCTURA HYOSCYAMI, U. S. P. IX.

Tr. Hyosc.

Tincture of Hyoscyamus, Tincture of Henbane. Included in the International Protocol as Hyoscyami Tinctura (P. I.). Yields from 0.0055 to 0.0075 w/v per cent of the total alkaloids of hyoscyamus. Made by extracting hyoscyamus (10) with diluted alcohol. Method of assay.

Average dose: 2 mils or 30 minims.

TINCTURA IGNATIE, N. F. IV.

Tr. Ignat.

Tincture of Ignatia. Represents ignatia (10), alcohol (80), and water (to make 100) and contains from 0.18 to 0.22 w/v per cent of total alkaloids from ignatia when assayed by the method outlined.

Average dose: 0.6 mil or 10 minims.

TINCTURA IODI, U. S. P. IX.

Tr. Iodi.

Tincture of Iodine. Not identical with the preparation official in European pharmacopœias as Tinctura Jodi (E). Contains from 6.5 to 7.5 w/v per cent of I and from 4.5 to 5.5 w/v per cent of KI. Made by dissolving iodine (7), potassium iodide (5), with water (5) in alcohol (to make 100).

Average dose: 0.1 mil or 1½ minims.

TINCTURA IODI, Churchill, N. F. III. See *Tinctura Iodi Fortior*.
N. F. IV.

TINCTURA IODI DECOLORATA, N. F. IV. Tr. Iod. Decolor.

Decolorized Tincture of Iodine. Represents a solution of iodides and iodates produced by mixing iodine (8.3), sodium thiosulphate (8.3), water (10), stronger ammonia water (6.5), and alcohol (to make 100).

TINCTURA IODI FORTIOR, N. F. IV. Tr. Iod. Fort.

Stronger Tincture of Iodine, Churchill's Tincture of Iodine. A solution of iodine (16.5) in a mixture of potassium iodide (3.3), water (25), and alcohol (to make 100).

TINCTURA IPECACUANHÆ ET OPII, N. F. IV. From U. S. P. VIII.

Tr. Ipecac. et Opii

Tincture of Ipecac and Opium, Tincture of Dover's Powder. A mixture of tincture of deodorized opium (100 evaporated to 80), fluidextract of ipecac (10), and diluted alcohol (to make 100).

Average dose: 0.5 mil or 8 minims.

Preparation: N. F.—*Syrupus Ipecacuanhæ et Opii*.

TINCTURA JALAPÆ, N. F. IV.

Tr. Jalap.

Tincture of Jalap. Represents jalap (20), alcohol (65), and water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

TINCTURA JALAPÆ COMPOSITA, N. F. IV.

Tr. Jalap Co.

Compound Tincture of Jalap. Represents jalap (12.5), resin of scammony (3), in alcohol (66), and water (to make 100).

Average dose: 4 mils. or 1 fluidrachm.

TINCTURA KINO, U. S. P. IX.

Tr. Kino.

Tincture of Kino. Represents kino (10) in diluted alcohol (to make 100).

Average dose: 4 mils or 1 fluidrachm.

Preparation: N. F.—*Tinctura Kino et Opii Composita*.

TINCTURA KINO COMPOSITA, N. F. III. See *Tinctura Kino et Opii Composita*, N. F. IV.

TINCTURA KINO ET OPII COMPOSITA, N. F. IV. Tr. Kino et Opii Co.

Compound Tincture of Kino and Opium, *Tinctura Kino Composita*, N. F. III, Compound Tincture of Kino. A mixture of tincture of kino (20), tincture of opium (10), spirit of camphor (6.5), oil of clove, (0.15), cochineal (0.85), aromatic spirit of ammonia (0.8), and diluted alcohol (to make 100).

Average dose: 4 mils or 1 fluidrachm.

TINCTURA KRAMERIÆ, N. F. IV. From U. S. P. VIII. Tr. Kramer.

Tincture of Krameria. Represents krameria (20) and diluted alcohol (to make 100).

Average dose: 4 mils or 1 fluidrachm.

TINCTURA LACTUCARII, U. S. P. IX. Tr. Lactucar.

Tincture of Lactucarium. Represents lactucarium (50) in a mixture of glycerin (25), alcohol (50), and water (to make 100).

Average dose: 2 mils or 30 minims.

Preparation: U. S. P.—Syrupus Lactucarii.

TINCTURA LAVANDULÆ COMPOSITA, U. S. P. IX. Tr. Lavand Co.

Compound Tincture of Lavender, Compound Spirit of Lavender. Represents oil of lavender (0.8), oil of rosemary (0.2), saigon cinnamon (2), clove (0.5), myristica (1), and red saunders (1), in a mixture of alcohol (75), and water (to make 100).

Average dose: 2 mils or 30 minims.

Preparation: U. S. P.—Liquor Potassii Arsenitis.

TINCTURA LIMONIS CORTICIS, U. S. P. IX. Tr. Limon. Cort.

Tincture of Lemon Peel. Made by extracting fresh lemon peel (50) with alcohol (to make 100).

Preparations: U. S. P.—Syrupus Acidi Citrici, Syrupus Hypophosphitum.

N. F.—Emulsum Petrolati, Syrupus Calcii Hydrochlorophosphatis.

TINCTURA LOBELIÆ, U. S. P. IX. Tr. Lobel.

Tincture of Lobelia. Included in the International Protocol as Lobeliæ Tinctura (P. I.). Made by extracting lobelia (10) with diluted alcohol (to make 100).

Average dose: 1 mil or 15 minims.

TINCTURA MATICO, N. F. 111. Deleted.

TINCTURA MOSCHI, U. S. P. IX. Tr. Mosch.

Tincture of Musk. Represents musk (5) in diluted alcohol (to make 100).

Average dose: 4 mils or 1 fluidrachm.

TINCTURA MYRRHÆ, U. S. P. IX. Tr. Myrrh.

Tincture of Myrrh. Made by extracting myrrh (20) with alcohol (to make 100).

Average dose: 1 mil or 15 minims.

TINCTURA NUCIS VOMICÆ, U. S. P. IX. Tr. Nuc. Vom.

Tincture of Nux Vomica. Included in the International Protocol as Strychni Tinctura (P. I.). Yields from 0.237 to 0.263 w/v per cent of the total alkaloids of nux vomica. Now made by extracting nux vomica (10) with a mixture of alcohol (75) and water (to make 100). Method of assay.

Average dose: 0.5 mil or 8 minims.

Preparation: N. F.—Elixir Phosphori et Nucis Vomicæ.

TINCTURE OPII, U. S. P. IX. Tr. Opii.

Tincture of Opium, Laudanum. Included in the International Protocol as Opii Tinctura (P. I.). Yields from 0.95 to 1.05 w/v per

cent of anhydrous morphine. Represents granulated opium (10) and diluted alcohol (to make 100). Method of assay.

Average dose: 0.5 mil or 8 minims.

Preparations: N. F.—Linimentum Opii Compositum, Lotio Plumbi et Opii, Mistura Carminativa, Mistura Camphoræ Acida, Mistura Opii et Chloroformi Composita, Mistura Opii et Rhei Composita, Mistura Copaibæ et Opii, Mistura Magnesiae Asafœtidæ et Opii, Mistura Opii et Sassafras, Tinctura Kino et Opii Composita, Tinctura Pectoralis.

TINCTURA OPII CAMPHORATA, U. S. P. IX. Tr. Opii Camph.

Camphorated Tincture of Opium, Paregoric. Included in the International Protocol as Opii Tinctura Benzoica (P. I.). Represents powdered opium (0.4), benzoic acid (0.4), camphor (0.4), oil of anise (0.4), in a mixture of glycerin (4), and diluted alcohol (to make 100).

Average dose: 4 mils or 1 fluidrachm.

Preparation: U. S. P.—Mistura Glycyrrhizæ Composita.

N. F.—Mistura Pectoralis, Stokes.

TINCTURA OPII CROCATI, N. F. IV. New. Tr. Opii Crocat.

Tincture of Opium with Saffron, Sydenham's Laudanum, Tinctura Opii Crocata (P. I.). Represents granulated opium (10), saffron (2.5), saigon cinnamon (0.6), clove (0.6), and diluted alcohol (to make 100). Yields from 0.95 to 1.05 w/v per cent of anhydrous morphine when assayed by the method outlined.

Average dose: 0.6 mil or 10 minims.

TINCTURA OPII DEODORATI, U. S. P. IX. Tr. Opii Deod.

Tincture of Deodorized Opium. Represents an aqueous extract of granulated opium (10), deodorized by means of purified petroleum benzin, preserved by the addition of alcohol and diluted with water (to make 100). Yields from 0.95 to 1.05 w/v per cent of anhydrous morphine. Method of assay.

Average dose: 0.5 mil or 8 minims.

Preparation: N. F.—Tinctura Ipecacuanhæ et Opii.

TINCTURA PAPAVERIS, N. F. III. Deleted.

TINCTURA PARACOTO, N. F. IV. Tr. Paracoto.

Tincture of Paracoto, Tinctura Coto, N. F. III. Represents paracoto (12.5) and alcohol (to make 100).

Average dose: 2 mils or 30 minims.

TINCTURA PASSIFLORÆ, N. F. IV. New. Tr. Passiflor.

Tincture of Passion Flower. Represents passion flower (20) and diluted alcohol (to make 100).

Average dose: 0.6 mil or 10 minims.

TINCTURA PECTORALIS, N. F. IV.

Tr. Pectoral.

Pectoral Tincture, Guttæ Pectorales, Pectoral Drops, Bateman's Pectoral Drops. A mixture of tincture of opium (4.2), compound tincture of gambir (6.4), spirit of camphor (4), oil of anise (0.1), caramel (1.6), and diluted alcohol (to make 100).

Average dose: Infants 0.6 mil or 10 minims.

TINCTURA PERSIONIS, N. F. IV.

Tr. Persion.

Tincture of Cudbear. Now represents cudbear (10), alcohol (75), and water (to make 100).

Preparations: N. F.—Used as a coloring.

TINCTURA PERSIONIS COMPOSITA, N. F. IV.

Tr. Persion. Co.

Compound Tincture of Cudbear. Represents cudbear (1.5), caramel (10), alcohol and water (to make 100).

Preparations: N. F.—Used as a coloring.

TINCTURA PHYSOSTIGMATIS, U. S. P. IX.

Tr. Physostig.

Tincture of Physostigma, Tincture of Calabar Bean. Yields from 0.013 to 0.017 w/v per cent of the alkaloids of physostigma. Made by extracting physostigma (10) with alcohol (to make 100). Method of assay.

Average dose: 1 mil or 15 minims.

TINCTURA PIMPINELLÆ, N. F. IV.

Tr. Pimpinell.

Tincture of Pimpinella. Now represents pimpinella (20), alcohol (65), and water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

TINCTURA PULSATILLÆ, N. F. IV. New.

Tr. Pulsatil.

Tincture of Pulsatilla. Represents pulsatilla (10), alcohol (75), and water (to make 100).

Average dose: 2 mils or 30 minims.

TINCTURA PYRETHRI, U. S. P. IX.

Tr. Pyreth.

Tincture of Pyrethrum, Tincture of Pellitory. Made by extracting pyrethrum (20) with alcohol (to make 100).

TINCTURA QUASSIÆ, U. S. P. IX.

Tr. Quas.

Tincture of Quassia. Made by extracting quassia (20) with a mixture of alcohol (33) and water (to make 100).

Average dose: 2 mils or 30 minims.

TINCTURA QUILLAJÆ, N. F. IV. From U. S. P. VIII.

Tr. Quillaj.

Tincture of Quillaja. Represents quillaja (20), alcohol (35), and water (to make 100).

TINCTURA RHEI, U. S. P. IX.

Tr. Rhei.

Tincture of Rhubarb. Made by extracting a mixture of rhubarb (20) and cardamom seed (3) with a mixture of glycerin (10), alcohol (50), and water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

Preparation: N. F.—Mistura Opii et Rhei Composita.



TINCTURA RHEI AQUOSA, N. F. IV.

Tr. Rhei Aq.

Aqueous Tincture or Rhubarb. Now represents rhubarb (10), potassium carbonate (1), cinnamon water (12.5), alcohol (11), and water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

TINCTURA RHEI AROMATICA, U. S. P. IX.

Tr. Rhei. Arom.

Aromatic Tincture of Rhubarb. Made by extracting a mixture of rhubarb (20), saigon cinnamon (4), clove (4), and myristica (2) with a mixture of glycerin (10), alcohol (50), and water (to make 100).

Average dose: 2 mils or 30 minims.

Preparation: U. S. P.—Syrupus Rhei Aromaticus.

TINCTURA RHEI DULCIS, N. F. IV.

Tr. Rhei. Dulc.

Sweet Tincture of Rhubarb. Represents rhubarb (10), glycyrrhiza (4), anise (4), cardamom seed (1), glycerin (10), alcohol (50), and water (to make 100).

Average dose: 2 mils or 30 minims.

TINCTURA RHEI ET GENTIANÆ, N. F. IV.

Tr. Rhei et Gent.

Tincture of Rhubarb and Gentian. Represents rhubarb (7), gentian (1.75), and diluted alcohol (to make 100).

Average dose: 4 mils or 1 fluidrachm.

TINCTURA RHEI VINOSA, N. F. III. See Vinum Rhei Compositum, N. F. IV.**TINCTURA SABAL ET SANTALI, N. F. IV. New.**

Tr. Sabal et Santal.

Tincture of Saw Palmetto and Santal. Represents sabal (20), sandal wood (6.5), alcohol (80), and water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

TINCTURA SANGUINARIÆ, U. S. P. IX.

Tr. Sanguin.

Tincture of Sanguinaria, Tincture of Bloodroot. Made by extracting sanguinaria (10) with a mixture of hydrochloric acid (1), alcohol (60), and water (to make 100).

Average dose: 1 mil or 15 minims.

TINCTURA SAPONIS VIRIDIS COMPOSITA, N. F. III. See Linimentum Saponis Mollis Compositum, N. F. IV.**TINCTURA SCILLÆ, U. S. P. IX.**

Tr. Scill.

Tincture of Squill. The minimum lethal dose should not be greater than 0.006 mil for each gramme of body weight of frog. Made by extracting squill (10) with a mixture of alcohol (75) and water (to make 100). Biological method of assay.

Average dose: 1 mil or 15 minims.

TINCTURA SERPENTARIE, N. F. IV. From U. S. P. VIII.

Tr. Serpent.

Tincture of *Serpentaria*. Represents *serpentaria* (20), alcohol (65), and water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

TINCTURA STRAMONII, U. S. P. IX.

Tr. Stramon.

Tincture of *Stramonium*. Yields from 0.0225 to 0.0275 w/v per cent of the total alkaloids of *stramonium*. Made by extracting *stramonium* (10) with diluted alcohol to (make 100). Method of assay.

Average dose: 0.5 mil or 8 minims.

TINCTURA STRAMONII SEMINIS, N. F. III. Deleted.**TINCTURA STROPHANTHI, U. S. P. IX.**

Tr. Strophanth.

Tincture of *Strophanthus*. Included in the International Protocol as *Strophanthi Tinctura* (P. I.). The minimum lethal dose should not be greater than 0.00006 mil of tincture for each gramme of body weight of frog. Represents deoleated *strophanthus* (10) in alcohol (to make 100). Biological method of assay.

Average dose: 0.5 mil or 8 minims.

TINCTURA SUMBUL, N. F. IV.

Tr. Sumbul.

Tincture of *Sumbul*. Represents *sumbul* (10), alcohol (65), and water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

TINCTURA TOLUTANA, U. S. P. IX.

Tr. Tolu.

Tincture of *Tolu*. Represents *balsam of tolu* (20) in alcohol (to make 100).

Average dose: 2 mils or 30 minims.

Preparation: U. S. P.—*Syrupus Tolutanus*.

TINCTURA TOLUTANA ÆTHEREA, N. F. IV. Deleted.**TINCTURA TOLUTANA SOLUBILIS, N. F. III. Deleted.****TINCTURA VALERIANÆ, U. S. P. IX.**

Tr. Valer.

Tincture of *Valerian*. Made by extracting *valerian* (20) with a mixture of alcohol (75) and water (to make 100)

Average dose: 4 mils or 1 fluidrachm.

TINCTURA VALERIANÆ AMMONIATA, U. S. P. IX. Tr. Valer Ammon.

Ammoniated Tincture of *Valerian*. Made by extracting *valerian* (20) with aromatic spirit of *ammonia* (to make 100).

Average dose: 2 mils or 30 minims.

TINCTURA VANILLÆ, N. F. IV. From U. S. P. VIII.

Tr. Vanill.

Tincture of *Vanilla* (*Extract of Vanilla*). Represents *vanilla* (10), sugar (20), and diluted alcohol (to make 100).

Preparations: N. F.—Elixir Ammonii Valeratis, Elixir Humuli, Elixir Strychninæ Valeratis, Emulsum Olei Ricini, Syrupus Bromidorum.

TINCTURA VANILLINI COMPOSITA, N. F. III. Deleted.

TINCTURA VERATRI, U. S. P. VIII. See Tinctura Veratri Viridis, U. S. P. IX.

TINCTURA VERATRI VIRIDIS, U. S. P. IX. Tr. Verat. Vir.

Tincture of Veratrum Viride, Tincture of Green Hellebore. Made by extracting veratrum viride (10) with alcohol (to make 100).

Average dose: 0.5 mil or 8 minims.

TINCTURA VIBURNI OPULI COMPOSITA, N. F. IV.

Tr. Viburn. Opul. Co.

Compound Tincture of Viburnum. Represents viburnum opulus (3.5), dioscorea (3.5), scutellaria (1), clove (5), saigon cinnamon (6.5), glycerin (7.5), alcohol (75), and water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

TINCTURA ZEDOARÆ AMARA, N. F. IV. Tr. Zedoar. Amar.

Bitter Tincture of Zedoary, Compound Tincture of Zedoary. Represents zedoary (25), aloes (12.5), rhubarb (6.2), gentian (6.2), agaric (6.2), saffron (6.2), glycerin (12.5), alcohol (60), and water (to make 100).

Average dose: 4 mils or 1 fluidrachm.

TINCTURA ZINGIBERIS, U. S. P. IX. Tr. Zingib.

Tincture of Ginger, Tincture of Jamaica Ginger. Made by extracting Jamaica ginger (20) with alcohol (to make 100).

Preparation: U. S. P.—Acidum Sulphuricum Aromaticum.

TINCTURÆ ÆTHEREÆ, N. F. IV.

Ethereal Tinctures. A general formula.

TINCTURÆ HERBARUM RECENTIUM, U. S. P. VIII. See Tinctura Medicamentorum Recentium, N. F. IV.

TINCTURÆ MEDICAMENTORUM RECENTIUM, N. F. IV. From U. S. P. VIII.

Tinctures of Fresh Drugs, Tinctura Herbarum Recentium, U. S. P. VIII. A general formula.

TOXITABELLÆ HYDRARGYRI CHLORIDI CORROSIVI, U. S. P. IX. New.

Toxitabel. Hydrarg. Chlor. Corr.

Poison Tablets of Corrosive Mercuric Chloride. Corrosive Sublimate Tablets, Bichloride Tablets. Tablets of an angular shape, each having the word "Poison" and the skull and cross bones design distinctly stamped upon it. Each one gram tablet contains from 0.45 to 0.55 gm. or corrosive mercuric chloride (HgCl_2 with NaCl). Tests and a method of assay.

TRAGACANTHA, U. S. P.

Trag.

Tragacanth, Gum Tragacanth. The dried gummy exudation from the stems of several species of *Astragalus*. Yields not more than 3.5 per cent of ash.

Preparations: U. S. P. Mucilago Tragacanthæ.

N. F.—Emulsum Olei Morrhuæ cum Malto, Glyceritum Tragacanthæ, Stilus Acidi Salicylici Dilubilis, Trochisci Carbonis Ligni, Trochisci Gambir, Trochisci Quininæ Tannatis, Trochisci Santonini, Trochisci Santonini Compositi, Trochisci Sulphuris et Potassii Bitartratis, Trochisci Ulmi.

TRIFOLIUM, N. F. Part II.

Trifol.

Trifolium or Red Clover Blossoms. The dried flowering heads of *Trifolium pratense* Linné. Yields not more than 10 per cent of ash. Average dose: 4 gm. or 1 drachm.

Preparation: N. F.—Fluidextractum Trifolii.

TRILLIUM, N. F. IV. Part II.

Trill.

Beth Root. The dried rhizome of *Trillium erectum* Linné and closely allied species of *Trillium*. Yields not more than 5 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparation: N. F.—Fluidextractum Trillii.

TRINITROPHENOL, U. S. P. IX. New.

Trinitrophen.

Trinitrophenol, Picric Acid. Trinitrophenol ($C_6H_3O_7N_3$). Should be preserved in well-stoppered bottles remote from fire. For safety in transportation it is usually mixed with about 20 per cent of water. Tests for identity and purity.

Average dose: 0.03 gm. or $\frac{1}{2}$ grain.

TRITICUM, U. S. P. IX.

Tritic.

Triticum, Couch Grass, Dog Grass, Sweet Grass. The dried rhizome and roots of *Agropyron repens* Beauvois. Contains not more than 3 per cent of ash.

Average dose: 8 gm. or 2 drachms.

Preparation: U. S. P.—Fluidextractum Tritici.

TRITURATIONES, U. S. P. IX.

Triturations. A general formula directing that triturations be made by mixing the substance (10) with powdered sugar of milk (to make 100).

TRITURATIO ELATERINI, U. S. P. IX.

Trit. Elaterin.

Trituration of Elaterin. A mixture of elaterin (10) with powdered sugar of milk (to make 100).

Average dose: 0.03 gm. or $\frac{1}{2}$ grain.

TROCHISCI ACIDI TANNICI, U. S. P. IX.

Troch. Acid. Tann.

Troches of Tannic Acid. Each troche contains tannic acid (0.06), sugar (0.65), tragacanth (0.02) flavored with orange flower water.

TROCHISCI AMMONII CHLORIDI, U. S. P. IX. Troch. Ammon. Chlor.

Troches of Ammonium Chloride. Each troche contains ammonium chloride (0.1), extract of glycyrrhiza (0.2), tragacanth (0.02) flavored with orange flower water.

TROCHISCI CARBONIS LIGNI, N. F. IV. New. Troch. Carb. Lig.

Troches of charcoal. Each troche contains charcoal (0.3), tragacanth (0.04), sugar (0.66), and vanillin (0.003).

Average dose: 1 troche.

TROCHISCI CATECHU, N. F. III. See Trochisci Gambir, N. F. IV.

TROCHISCI CRETÆ, N. F. III. Deleted.

TROCHISCI CUBEÆ, U. S. P. IX. Troch. Cubeb.

Troches of Cubeb. Each troche contains oleoresin of cubeb (0.02), oil of sassafras (0.01), extract of glycyrrhiza (0.25), acacia (0.12), flavored with syrup of tolu.

TROCHISCI FERRI, N. F. III. Deleted.

TROCHISCI GAMBIR, N. F. IV. From U. S. P. VIII. Troch. Gambir.

Troches of Gambir, Trochisci Catechu, N. F. III. Each troche now contains gambir (0.06), tragacanth (0.03), sugar (0.91), and oil of cinnamon (0.002).

Average dose: 1 troche.

TROCHISCI GLYCERRHIZÆ ET OPII, U. S. P. VIII. Deleted.

TROCHISCI IPECACUANHÆ, N. F. III. Deleted.

TROCHISCI KRAMERLÆ, U. S. P. VIII. Deleted.

TROCHISCI MAGNESIÆ, N. F. III. Deleted.

TROCHISCI MENTHÆ PIPERITÆ, N. F. IV. Troch. Menth. Pip.

Troches of Peppermint. Each troche contains oil of peppermint (0.01), sugar (1.0), and mucilage of tragacanth (to make a mass).

Average dose: 1 troche.

TROCHISCI MORPHINÆ ET IPECACUANHÆ, N. F. III. Deleted.

TROCHISCI PHENOLPHTHALEINI, N. F. IV. New.

Troch. Phenolphthal.

Troches of Phenolphthalein. Each troche contains phenolphthalein (0.06), acacia (0.1), sugar (0.84), vanillin (0.003), and carmine (0.001).

Average dose: 1 troche.

TROCHISCI POTASSII CHLORATIS, U. S. P. IX. Troch. Pot. Chlorat.

Troches of Potassium Chlorate. Each troche contains potassium chlorate (0.15), sugar (0.6), and tragacanth (0.03).

TROCHISCI QUININÆ TANNATIS, N. F. IV. New. Troch. Quin. Tan.

Troches of Quinine Tannate. Each troche contains quinine tannate (0.06), tragacanth (0.03), oil of theobroma (0.05), prepared

cocoa (0.25), sugar (0.6,) vanilla (0.003), and sodium benzosulphinide (0.002).

Average dose: 1 troche.

TROCHISCI SANTONINI, N. F. IV. From U. S. P. VIII.

Troch. Santonin.

Troches of Santonin. Each troche now contains santonin (0.03), tragacanth (0.03), sugar (0.54), prepared cocoa (0.4), and vanillin (0.001).

Average dose: 1 troche.

TROCHISCI SANTONINI COMPOSITI, N. F. IV. New.

Troch. Santonin. Co.

Compound Troches of Santonin, Troches of Santonin and Calomel. Each troche contains santonin (0.03), mild mercurous chloride (0.03), tragacanth (0.03), sugar (0.51), cocoa (0.4), and vanillin (0.001).

Average dose: 1 troche.

TROCHISCI SODII BICARBONATIS, U. S. P. IX. Troch. Sod. Bicarb.

Troches of Sodium Bicarbonate. Each troche contains sodium bicarbonate (0.18), sugar (0.54), myristica (0.01), and mucilage of tragacanth (to make 100).

TROCHISCI SODII SANTONINATIS, N. F. III. Deleted.

TROCHISCI SULPHURIS ET POTASSII BITARTRATIS, N. F. IV. New.

Troch. Sulphur. et Pot. Bitart.

Troches of Sulphur and Potassium Bitartrate, Troches of Sulphur and Cream of Tartar. Each troche contains washed sulphur (0.3), potassium bitartrate (0.06), tragacanth (0.04), sugar (0.6), and oil of orange peel (0.005).

Average dose: 1 troche.

TROCHISCI ULMI, N. F. IV.

Troch. Ulmi.

Troches of Elm. Each troche contains elm bark (0.3), tragacanth (0.01), sugar (0.79), and methyl salicylate (0.002).

Average dose: 1 troche.

TROCHISCI ZINGIBERIS, N. F. III. Deleted.

ULMUS, U. S. P. IX.

Elm. Slippery Elm, Elm Bark. The bark of *Ulmus fulva* Michaux deprived of the outer corky layer and dried.

Preparation: Trochisci Ulmi.

UNGUENTA EXTENSA, N. F. III. See Mullæ, N. F. IV.

UNGUENTUM, U. S. P. IX.

Ung.

Ointment, Simple Ointment. Official in European pharmacopœias as Unguentum Simplex (E). A mixture of white wax (20) and benzoinated lard (to make 100).

Preparations: U. S. P.—Unguentum acidi Tannici, Unguentum Gallæ.

N. F.—Unguentum Calaminæ.

UNGUENTUM ACIDI BORICI, U. S. P. Ung. Acid. Bor.

Ointment of Boric Acid. A mixture of boric acid (10), paraffin (5), and white petrolatum (to make 100).

UNGUENTUM ACIDI GALlici, N. F. III. Deleted.

UNGUENTUM ACIDI TANNICI, U. S. P. IX. Ung. Acid. Tann.

Ointment of Tannic Acid. A mixture of tannic acid (20), glycerin (20), and ointment (to make 100).

UNGUENTUM AQUÆ ROSÆ, U. S. P. IX. Ung. Aq. Ros.

Ointment of Rose Water. Official in European pharmacopœias as Unguentum Cetacei (E). A mixture of spermaceti (12.5), white wax (12), expressed oil of almond (56), sodium borate (0.5), and stronger rose water (to make 100).

UNGUENTUM BELLADONNÆ, U. S. P. IX. Ung. Bellad.

Belladonna Ointment. A mixture of pilular extract of belladonna leaves (10), diluted alcohol (5), hydrous wool fat (30), and benzoinated lard (to make 100).

UNGUENTUM CALAMINÆ, N. F. IV. Ung. Calamin.

Calamine Ointment (Unguentum Zinci Carbonatis Crudi, Unguentum Calaminare, Turner's Cerate). Now a mixture of prepared calamine (17) and ointment (to make 100).

UNGUENTUM CAMPHORÆ, N. F. IV. Ung. Camph.

Camphor Ointment. A mixture of camphor (22), white wax (11), and lard (to make 100).

UNGUENTUM CHRYSAROBINI, U. S. P. IX. Ung. Chrysarobin.

Chrysarobin Ointment. A mixture of chrysarobin (6) and benzoinated lard (to make 100).

UNGUENTUM CREOSOTI SALICYLATUM EXTENSUM, N. F. III. See Mulla Creosoti Salicylata, N. F. IV.

UNGUENTUM DIACHYLON, U. S. P. IX. Ung. Diachyl.

Diachylon Ointment. A mixture of lead plaster (50), oil of lavender (1), and white petrolatum (to make 100).

UNGUENTUM FUSCUM, N. F. IV. Ung. Fusc.

Brown Ointment, Unguentum Matris, Mother's Salve. A mixture of camphorated brown plaster (50), olive oil (25), and prepared suet (to make 100).

UNGUENTUM GALLÆ, U. S. P. IX. Ung. Gall.

Nutgall Ointment. A mixture of nutgall (20) and ointment (to make 100).

UNGUENTUM HYDRARGYRI, U. S. P. IX. Ung. Hydrarg.

Mercurial Ointment. A weaker preparation is included in the International Protocol, as Hydrargyri Unguentum (P. I.). A mixture of mercury (50), oleate of mercury (2), prepared suet (23), and benzoinated lard (to make 1000). Yields from 49 to 51 per cent of Hg. Method of assay.

Preparation: U. S. P.—Unguentum Hydrargyri Dilutum.

UNGUENTUM HYDRARGYRI AMMONIATI, U. S. P. IX.

Ung. Hydrarg. Ammon.

Ointment of Ammoniated Mercury, White Precipitate Ointment. Official in European pharmacopœias as Unguentum Hydrargyri Album (E). A mixture of ammoniated mercury (10), white petrolatum (50), and hydrous wool fat (to make 100).

UNGUENTUM HYDRARGYRI CHLORIDI CORROSIVI EXTENSUM, N. F. III.

See Mulla Hydrargyri Chloridi Corrosivi, N. F. IV.

UNGUENTUM HYDRARGYRI DILUTUM, U. S. P. IX. Ung. Hydrarg. Dil.

Diluted Mercurial Ointment. (Blue Ointment.) Hydrargyri Unguentum (P. I.). Now a mixture of mercurial ointment (60) and petrolatum (to make 100). Yields from 29 to 31 per cent of Hg. Method of assay.

UNGUENTUM HYDRARGYRI NITRATIS, U. S. P. IX.

Ung. Hydrarg. Nit.

Ointment of Mercuric Nitrate, Citrine Ointment. Made by the interaction of mercury (7), nitric acid (17.5), and lard (to make 100).

UNGUENTUM HYDRARGYRI OXIDI FLAVI, U. S. P. IX.

Ung. Hydrarg. Oxid. Flav.

Ointment of Yellow Mercuric Oxide. A mixture of yellow mercuric oxide (10), water (10), hydrous wool fat (40), and petrolatum (to make 100).

UNGUENTUM HYDRARGYRI OXIDI RUBRI, N. F. IV. From U. S. P. VIII.

Ung. Hydrarg. Oxid. Rub.

Ointment of Red Mercuric Oxide. A mixture of red mercuric oxide (10), hydrous wool fat (40), and petrolatum (to make 100).

UNGUENTUM IODI, U. S. P. IX.

Ung. Iodi.

Iodine Ointment. A mixture of iodine (4), potassium iodide (4), glycerin (12), and benzoinated lard (to make 100).

UNGUENTUM IODOFORMI, U. S. P. IX.

Ung. Iodof.

Iodoform Ointment. A mixture of iodoform (10), and benzoinated lard (to make 100).

UNGUENTUM MEZEREI, N. F. III. Deleted.

UNGUENTUM PHENOLIS, U. S. P. IX.

Ung. Phenol.

Ointment of Phenol, Ointment of Carbolic Acid. A mixture of liquefied phenol (2.25) and ointment (to make 100).

UNGUENTUM PICIS COMPOSITUM, N. F. IV. Ung. Pic. Co.

Compound Tar Ointment. A mixture of rectified oil of tar (4), tincture of benzoin (2), zinc oxide (3), yellow wax (25), lard (32), and cottonseed oil (to make 100).

UNGUENTUM PICIS LIQUIDÆ, U. S. P. IX. Ung. Pic. Liq.

Tar Ointment. A mixture of tar (50), yellow wax (15), and lard (to make 100).

UNGUENTUM PLUMBI CARBONATIS, N. F. III. Deleted.

UNGUENTUM PLUMBI IODIDI, N. F. IV. Ung. Plumb. Iod.

Ointment of Lead Iodide. A mixture of lead iodide (10) and benzoinated lard (to make 100).

UNGUENTUM POTASSII IODIDI, N. F. IV. From U. S. P. VIII.

Ung. Pot. Iod.

Ointment of Potassium Iodide. Now a mixture of potassium iodide (10), sodium thiosulphate (1), and benzoinated lard (to make 100).

UNGUENTUM RESORCINI COMPOSITUM, N. F. III. See Unguentum Resorcinolis Compositum, N. F.

UNGUENTUM RESORCINOLIS COMPOSITUM, N. F. IV.

Ung. Resorcin. Co.

Compound Resorcinol Ointment. As modified, a mixture of resorcinol (6), zinc oxide (6), bismuth subnitrate (6), rectified oil of birch tar (6), yellow wax (10), petrolatum (25), wool fat (28), and glycerin (to make 100).

UNGUENTUM SALICYLATUM EXTENSUM, N. F. III. See Mulla Acidi Salicylici, N. F.

UNGUENTUM STRAMONII, U. S. P. IX.

Ung. Stramon.

Stramonium Ointment. A mixture of pilular extract of stramonium (10), diluted alcohol (5), hydrous wool fat (20), and benzoinated lard (to make 100).

UNGUENTUM SULPHURIS, U. S. P. IX.

Ung. Sulphur.

Sulphur Ointment. Official in European pharmacopœias as Unguentum Sulfuratum (E). A mixture of sublimed sulphur (15) and benzoinated lard (to make 100).

UNGUENTUM SULPHURIS ALKALINUM, N. F. IV. Ung. Sulphur. Alk.

Alkaline Sulphur Ointment. A mixture of sublimed sulphur (20), potassium carbonate (10), water (5), and benzoinated lard (to make 100).

UNGUENTUM SULPHURIS COMPOSITUM, N. F. IV. Ung. Sulphur Co.

Compound Sulphur Ointment, Wilkinson's Ointment, Hebra's Itch Ointment. A mixture of precipitated calcium carbonate (10), sublimed sulphur (15), oil of cade (15), soft soap (30), and lard (to make 100).

UNGUENTUM VERATRINÆ, N. F. IV. From U. S. P. VIII.

Ung. Veratrin.

Veratrine Ointment. A mixture of veratrine (4), expressed oil of almond (6), and benzoinated lard (to make 100).

UNGUENTUM ZINCI EXTENSUM, N. F. III. See Mulla Zinci, N. F. IV.

UNGUENTUM ZINCI OXIDI, U. S. P. IX.

Ung. Zinc. Ox.

Ointment of Zinc Oxide, Zinc Ointment. A mixture of zinc oxide (20) and benzoinated lard (to make 100).

UNGUENTUM ZINCI STEARATIS, N. F. IV. From U. S. P. VIII.

Ung. Zinc. Stear.

Ointment of Zinc Stearate. A mixture of zinc stearate (50) and white petrolatum (to make 100).

URANII NITRAS, U. S. P. IX. New.

Uran. Nit.

Uranium Nitrate. Contains not less than 98 per cent of $\text{UO}_2(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$. Test for identity and purity and a method of assay.

Average dose: 0.01 gm. or $\frac{1}{4}$ grain. Use with caution.

UVA URSI, U. S. P. IX.

Uva Ursi, Bearberry. Official in European pharmacopœias as *Folia Uvæ Ursi* (E). The dried leaves of *Arctostaphylos Uva-ursi*, Sprengel, without the admixture of more than 5 per cent of stems and other foreign matter.

Average dose: 2 gm. or 30 grains.

Preparations: U. S. P.—Fluidextractum Uvæ Ursi.

N. F.—Fluidextractum Buchu Compositum.

VALERIANA, U. S. P. IX.

Valer.

Valerian. Official in European pharmacopœias as *Rhizoma Valerianæ* (E). The dried rhizome and roots of *Valeriana officinalis* Linné. Contains not more than 20 per cent of ash.

Average dose: 2 gm. or 30 grains.

Preparations: U. S. P.—Tinctura Valerianæ, Tinctura Valerianæ Ammoniata.

N. F.—Fluidextractum Valerianæ.

VANILLA, N. F. Part II. From U. S. P. VIII.

Vanilla, Vanilla Bean. The cured, full grown unripe fruit of *Vanilla planifolia* Andrews. Yields not more than 6 per cent of ash.

Preparation: N. F.—Tinctura Vanillæ.

VANILLINUM, U. S. P. IX.

Vanillin.

Vanillin, Methylprotocatechuic aldehyde ($\text{C}_8\text{H}_8\text{O}_3$) occurring naturally in vanilla or prepared synthetically. Tests for identity and purity.

Average dose: 0.03 gm. or $\frac{1}{4}$ grain.

Preparations: N. F.—Elixir Amygdalæ Compositum, Liquor Ferri Peptonati, Liquor Ferri Petonati cum Mangano, Oleum Ricini Aromaticum, Spiritus Vanillini Compositus, Trochisci Carbonis Ligni, Trochisci Phenolphaleini, Trochisci Quininæ Tannatis, Trochisci Santonini, Trochisci Santonini Compositi.

VERATRINA, U. S. P. IX.

Veratrin.

Veratrine, Veratria. Official in European pharmacopœias as Veratrinum (E). A mixture of alkaloids obtained from the seed of *Asagraea officinalis* Lindley. Test for identity and purity.

Preparations: N. F.—Unguentum Vetratrinæ, used in making: Oleatum Vetratrinæ.

VERATRUM, U. S. P. VIII. See Veratrum Viride, U. S. P. IX.

VERATRUM VIRIDE, U. S. P. IX.

Verat. Vir.

Veratrum Viride, Green Hellebore, American Hellebore. Official in European pharmacopœias as Rhizoma Veratri (E). The dried rhizome and roots of *Veratrum Viride* Aiton without the admixture of more than 5 per cent of stems or other foreign matter.

Average dose: 0.06 gm. or 1 grain.

Preparations: U. S. P.—Fluidextractum Veratri Viridis, Tinctura Veratri Viridis.

VERBASI FLORES, N. F. IV. Part II.

Verbasc. Flor.

Mullein Flowers. The dried corollas with adhering stamens of *Verbascum phlomoides* Linné or of *Verbascum thapsiforme* Schæder.

Average dose: 8 gm. or 2 drachms.

Preparation: N. F.—Species Pectorales.

VERBASI FOLIA, N. F. IV. Part II.

Verbasc. Fol.

Mullein Leaves. The dried leaves of *Verbascum thapsus* Linné. Yields not more than 14 per cent of ash.

Average dose: 4 gm. or 1 drachm.

Preparation: N. F.—Fluidextractum Verbasci.

VERBENA, N. F. IV. Part II.

Verben.

Verbena, Blue Vervain. The dried overground portion of *Verbena hastata* Linné collected when flowering.

Preparation: N. F.—Fluidextractum Verbenæ.

VIBURNUM OPULUS, N. F. IV. Part II.

Viburn. Opol.

Viburnum Opulus (Cramp Bark), High Bush Cranberry Bark. The dried bark of *Viburnum opulus* var. *americanum* Aiton without admixture of more than 5 per cent of wood and other foreign matter.

Average dose: 2 gm. or 30 grains.

Preparations: N. F.—Fluidextractum Viburni Opuli, Tinctura Viburni Opuli Composita.

VIBURNUM PRUNIFOLIUM, U. S. P. IX. Viburn. Prun.

Viburnum Prunifolium, Black Haw, *Viburnum*. Official in European pharmacopœias as *Cortex Viburni* (E). The dried bark of *Viburnum prunifolium* Linné or of *Viburnum lantago* Linné without admixture of more than 5 per cent of wood or other foreign matter.

Average dose: 2 gm. or 30 grains.

Preparations: U. S. P.—*Extractum Viburni Prunifolii*, *Fluidextractum Viburni Prunifolii* (which see).

VINUM ALBUM, U. S. P. VIII. Deleted.

VINUM ALBUM FORTIUS, N. F. III. Deleted.

VINUM ALOES, N. F. III. Deleted.

VINUM ANTIMONII, N. F. IV. From U. S. P. VIII. Vin. Antimon.

Wine of Antimony. As modified, a solution of antimony and potassium tartrate (0.4), in a mixture of distilled water (2.5), alcohol (17.5), and sherry wine (to make 100).

Average dose: 1 mil or 15 minims.

VINUM AURANTII COMPOSITUM, N. F. IV. Vin. Aurant. Co.

Compound Wine of Orange, *Elixir Aurantiorum Compositum*, Compound Elixir of Orange. Represents bitter orange peel (20), absinthium (6.5), menyantes (6.5), cascarilla (6.5), saigon cinnamon (4.3), gentian (4.3), potassium carbonate (1), and sherry wine (to make 100).

Average dose: 4 mils or 1 fluidrachm.

VINUM CARNIS, N. F. IV. Vin. Carn.

Wine of Beef, Beef and Wine. As modified, a solution of extract of beef (3), in a mixture of hot water (6), syrup (10), alcohol (5), compound spirit of orange (1), and sherry wine (to make 100).

Average dose: 8 mils or 2 fluidrachms.

VINUM CARNIS ET FERRI, N. F. IV. Vin. Carn. et Ferr.

Wine of Beef and Iron, Beef, Wine, and Iron. As modified, a solution of extract of beef (3) and iron and ammonium citrate (1) in a mixture of water (6), syrup (10), alcohol (5), compound spirit of orange (0.1), and sherry wine (to make 100).

Average dose: 8 mils or 2 fluidrachms.

VINUM CARNIS, FERRI ET CINCHONÆ, N. F. III. Deleted.

VINUM COCÆ, U. S. P. VIII. Deleted.

VINUM COCÆ AROMATICUM, N. F. III. Deleted.

VINUM COLCHICI, CORMI, N. F. IV. Vin. Colchic. Corm.

Wine of Colchicum Corm. Represents colchicum corm (40), alcohol (15), and sherry wine (to make 100). Yields when assayed

by the method for fluid extract of colchicum corm from 0.126 to 0.154 w/v per cent of colchicine.

Average dose: 0.6 mil or 10 minims.

VINUM COLCHICI RADICIS, N. F. III. See Vinum Colchici Cormi, N. F.

VINUM COLCHICI SEMINIS, N. F. IV. From U. S. P. VIII.

Vin. Colch. Sem.

Wine of Colchicum Seed. A mixture of fluidextract of colchicum seed (10), alcohol (15), and sherry wine (to make 100). Yields when assayed by the method for fluidextract of colchicum from 0.036 to 0.044 w/v per cent of colchicine.

Average dose: 2 mils or 30 minims.

VINUM ERGOTÆ, U. S. P. VIII. Deleted.

VINUM FERRI, N. F. IV. From U. S. P. VIII.

Vin. Ferr.

Wine of Iron (Vinum Ferri Citratis). Wine of Citrate of Iron. A solution of iron and ammonium citrate (4) in a mixture of tincture of sweet orange peel (6), syrup (10), and sherry wine (to make 100).

Average dose: 8 mils or 2 fluidrachms.

VINUM FERRI AMARUM, N. F. IV. From U. S. P. VIII.

Vin. Ferr. Amar.

Bitter Wine of Iron. Now a solution of iron and quinine citrate (5) in a mixture of tincture of sweet orange peel (6), syrup (30), and sherry wine (to make 100).

Average dose: 8 mils or 2 fluidrachms.

VINUM FRAXINI, N. F. IV.

VIN. FRAX.

Wine of White Ash. Now represents white ash bark (50), alcohol (12.5), and sherry wine (to make 100).

Average dose: 4 mils or 1 fluidrachm.

VINUM FRAXINI AMERICANÆ, N. F. III. See Vinum Fraxini, N. F. IV.

VINUM IPECACUANHÆ, N. F. IV. From U. S. P. VIII.

Vin. Ipecac.

Wine of Ipecac. A mixture of fluidextract of ipecac (10), alcohol (10), and sherry wine (to make 100). Yields when assayed by the method outlined from 0.18 to 0.22 w/v per cent of the alkaloids from ipecac.

Average dose: 1 mil or 15 minims.

VINUM OPII, U. S. P. VIII. Deleted. See Tinctura Opii Crocata, N. F. IV.

VINUM PEPSINI, N. F. IV.

Vin. Pepsin.

Wine of Pepsin, Pepsin Wine. A mixture of glycerite of pepsin (20), alcohol (10), and sherry wine (to make 100).

Average dose: 8 mils or 2 fluidrachms.

VINUM PICIS, N. F. IV.

Vin. Pic.

Wine of Tar. Now represents tar (10), freed from water soluble constituents in a mixture of alcohol (12.5) and sherry wine (87.5).

Average dose: 8 mils or 2 fluidrachms.

VINUM PRUNI VIRGINIANÆ, N. F.

Vin. Prun. Virg.

Wine of Wild Cherry. Now represents wild cherry (25), water (20), alcohol (10), sugar (16.5), and sherry wine (to make 100).

Average dose: 4 mils or 1 fluidrachm.

Preparation: N. F.—*Vinum Pruni Virginianæ Ferratum*.

VINUM PRUNI VIRGINIANÆ FERRATUM, N. F. IV.

Vin. Prun. Virg. Ferr.

Ferrated Wine of Wild Cherry. A mixture of tincture of ferric citro-chloride (8), and wine of wild cherry (to make 100).

Average dose: 4 mils or 1 fluidrachm.

VINUM RHEI, N. F. III. Deleted.**VINUM RHEI COMPOSITUM, N. F. IV.**

Vin. Rhei. Co.

Compound Wine of Rhubarb. A mixture of fluidextract of rhubarb (8), fluidextract of bitter orange peel (2), tincture of cardamom (8), sugar (12.5), and sherry wine (to make 100).

Average dose: 4 mils or 1 fluidrachm.

VINUM RUBRUM, U. S. P. VIII. Deleted.**VINUM XERICUM, N. F. IV. Part II.**

Vin. Xeric.

Sherry wine. An alcoholic liquid made by fermenting the juice of fresh ripe grapes the fruit of cultivated varieties of *Vitis* Linné freed from seeds, stems, and skins, and fortifying with pure grape brandy. Sherry wine contains from 16 to 24 per cent of absolute alcohol. Tests for identity and purity.

Preparation: N. F.—Used as a solvent and diluent.

VIRUS VACCINICUM, U. S. P. IX. New.

Virus Vaccin.

Vaccine Virus, Glycerinated Vaccine Virus, Jennerian Vaccine. Smallpox vaccine. Prepared from the pustules of vaccinia or cowpox from healthy vaccinated animals of the bovine species. Must comply with the regulations established by the U. S. Public Health Service.

XANTHOXYLUM, U. S. P. IX.

Xanthox.

Xanthoxylum, Prickly Ash Bark. The dried bark of *Xanthoxylum americanum* known in commerce as Northern Prickly Ash Bark or *Xanthoxylum Clava-Herculis* Linné known in commerce as Southern Prickly Ash Bark.

Average dose: 2 gm. or 30 grains.

Preparation: U. S. P.—*Fluidextractum Xanthoxyli*.



XANTHOXYLI FRUCTUS, N. F. IV. Part II. Xanthox. Fruct.

Prickly Ash Berries. The dried fruit of *Xanthoxylum americanum* Miller or *Xanthoxylum Clava-Herculis* Linné. Yields not more than 7 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparation: N. F.—Used in making Fluidextractum Stillingiæ Compositum.

ZEÄ, N. F. IV. Part II. From U. S. P. VIII.

Zea, Corn Silk. The fresh styles and stigmas of *Zea mays* Linné.

Average dose: 4 gm. or 1 drachm.

Preparation: N. F.—Fluidextractum Zeæ.

ZEDOARIA, N. F. IV. Part II.

Zedoar.

Zedoary. The dried rhizome of *Curcuma zedoaria* Roscoe. Yields not more than 7 per cent of ash.

Average dose: 1 gm. or 15 grains.

Preparations: Pilulæ Antiperiodicæ, Pilulæ Antiperiodicæ sine Aloe, Tinctura Antiperiodica, Tinctura Antiperiodica sine Aloe, Tinctura Zedoariæ Amara.

ZINCI ACETAS, U. S. P. IX.

Zinc. Acet.

Zinc Acetate. Contains from 83.16 to 87.32 per cent of anhydrous zinc acetate corresponding to not less than 99.5 per cent of the crystallized salt $\text{Zn}(\text{C}_2\text{H}_3\text{O}_2)_2 + 2\text{H}_2\text{O}$. Tests for identity and purity and a method of assay with an alternative electrolytic method.

Average dose: 0.125 gm. or 2 grains.

ZINCI BROMIDUM, U. S. P. VIII. Deleted.

ZINCI CARBONAS PRÆCIPITATUS, U. S. P. IX.

Zinc. Carb. Præc.

Precipitated Zinc Carbonate, Basic Zinc Carbonate. A compound of somewhat variable chemical composition corresponding to not less than 68 per cent of ZnO . Tests for identity and purity and a method of assay.

Preparation: Liquor Zinci Chloridi.

ZINCI CHLORIDUM, U. S. P. IX.

Zinc. Chlor.

Zinc Chloride. Official in European pharmacopœias as Zincum Chloratum (E). Chloretum Zincicum (S). Contains not less than 95 per cent of ZnCl_2 . Tests for identity and purity and a method of assay.

ZINCI IODIDUM, U. S. P. VIII. Deleted.

ZINCI OLEO-STEARAS, N. F. III. Deleted.

ZINCI OXIDUM, U. S. P. IX.

Zinc. Oxid.

Zinc Oxide. Official in European pharmacopœias as Zincum Oxydatum (E). Oxydatum Zincicum (S). Contains when freshly ignited

not less than 99 per cent of ZnO. Tests for identity and a method of assay.

Preparation: U. S. P.—Unguentum Zinci Oxidi.

N. F.—Glycerogelatinum Zinci Durum, Glycerogelatinum Zinci Molle, Mulla, Zinci, Pasta Resorcinolis Fortis, Pasta Resorcinolis Mitis, Pasta Zinci, Pasta Zinci Mollis, Pasta Zinci Sulphurata, Unguentum Resorcinolis Compositum, Unguentum Picis, Compositum.

ZINCI PHENOLSULPHONAS, U. S. P. IX. Zinc. Phenolsulph.

Zinc Phenolsulphonate, Zinc Sulphocarbolate. Contains from 73.7 to 77.4 per cent of anhydrous zinc phenolsulphonate corresponding to not less than 99.5 per cent of $\text{Zn}(\text{C}_6\text{H}_5\text{O}_2\text{SO}_3)_2 + \frac{1}{2}\text{H}_2\text{O}$. Tests for identity and purity and a method of assay with an alternative electrolytic method.

Average dose: 0.125 gm. or 2 grains.

ZINCI STEARAS, U. S. P. IX. Zinc. Stear.

Zinc Stearate. A compound of zinc with stearic acid and small but variable proportions of palmitic acid, containing an amount of zinc corresponding to from 13 to 15.5 per cent of ZnO. Tests for identity and purity and a method of assay.

Preparation: N. F.—Unguentum Zinci Stearatis.

ZINCI SULPHAS, U. S. P. IX. Zinc. Sulph.

Zinc Sulphate. Official in European pharmacopœias as Zincum Sulfuricum (E). Sulfas Zincicum (S). Contains from 55.86 to 58.65 per cent of anhydrous zinc sulphate, corresponding to not less than 99.5 per cent of $\text{ZnSO}_4 + 7\text{H}_2\text{O}$. Tests for identity and purity and a method of assay with an alternative electrolytic method.

Average dose: 1 gm. or 15 grains.

Preparations: N. F.—Liquor Zinci et Alumini Compositus. Liquor Zinci et Ferri Compositus, Mistura Adstringens, Pulvis Antisepticus.

ZINCI VALERAS, U. S. P. IX. Zinc. Valer.

Zinc Valerate, Zinc Valerianate. Official in European pharmacopœias as Zincum Valerianicum (E). Contains not less than 99 per cent of the crystallized salt $\text{Zn}(\text{C}_3\text{H}_7\text{O}_2)_2 + 2\text{H}_2\text{O}$. Tests for identity and purity and a method of assay.

Average dose: 0.125 gm. or 2 grains.

Preparation: Elixir Zinci Valeratis.

ZINCUM, U. S. P. IX. Zinc.

Zinc. Contains not less than 99 per cent of Zn. Tests for identity and purity and a method of assay with an alternative electrolytic method.

Preparation: U. S. P.—Liquor Zinci Chloridi.

ZINGIBER, U. S. P. IX.

Zingib.

Ginger. Official in European pharmacopœias as *Rhizoma Zingiberis* (E). The dried rhizomes of *Zingiber officinale*. Roscoe, the outer cortical layers of which are often partially or completely removed. The drug occurs in commerce as Jamaica ginger, African Ginger, Calcutta ginger, Calicut Ginger, Cochin Ginger, and Japanese Ginger.

Average dose: 1 gm. or 15 grains.

Preparations: U. S. P.—*Fluidextractum Zingiberis* (which see), *Oleoresina Zingiberis*, *Pulvis Aromaticus* (which see), *Pulvis Rhei Compositus*, *Tinctura Zingiberis* (which see).

N. F.—*Elixir Rubi Compositum*, *Pulvis Aromaticus*, *Rubefaciens*, *Pulvis Myricæ Compositus*, *Tinctura Antiperiodica*, *Tinctura Antiperiodica sine Aloe*, *Tinctura Aromatica*.

**ALPHABETICAL LIST OF OFFICIAL ENGLISH TITLES, WIDELY
USED SYNONYMS, AND TRADE NAMES WITH THE CORRE-
SPONDING LATIN TITLES OF THE U. S. P. AND N. F.**

(The official English titles are in italics.)

<i>Absinthium</i>	Absinthium, N. F.
<i>Absolute Alcohol</i>	Alcohol Dehydratum, U. S. P.
<i>Acacia</i>	Acacia, U. S. P.
<i>Acacia, Compound Powder of</i>	Pulvis Acaciæ Compositus, N. F. III.
<i>Acacia, Mixture of</i>	Mistura Acaciæ, N. F. III.
<i>Acacia, Syrup of</i>	Syrupus Acaciæ, U. S. P.
<i>Acetanilid</i>	Acetanilidum, U. S. P.
<i>Acetanilide</i>	Acetanilidum, U. S. P.
<i>Acetanilid Powder, Compound</i>	Pulvis Acetanilidi Compositus, N. F.
<i>Acetas plumbicus</i>	Plumbi Acetas, U. S. P.
<i>Acetic Acid</i>	Acidum Aceticum, U. S. P.
<i>Acetic Acid, Diluted</i>	Acidum Aceticum Dilutum, U. S. P. •
<i>Acetic Acid, Glacial</i>	Acidum Aceticum Glaciale, U. S. P.
<i>Acetic Ether</i>	Æther Aceticus, N. F.
<i>Acetic Turpentine Liniment</i>	Linimentum Terebinthinæ Aceticum, N. F.
<i>Acetone</i>	Acetonum, U. S. P.
<i>Acetphenetidin</i>	Acetphenetidinum, U. S. P.
<i>Acid</i>	See under English name of.
<i>Acid Camphor Mixture</i>	Mistura Camphoræ Acida, N. F.
<i>Acid, Phenylcinchonic</i>	Acidum Phenylcinchonicum, U. S. P.
<i>Acid Solution of Phosphates</i>	Liquor Phosphatum Acidus, N. F.
<i>Acidum Arsenicosum</i>	Arseni Trioxidum, U. S. P.
<i>Acidum Carbolicum</i>	Phenol, U. S. P.
<i>Acidum Carbolicum Iodatum, N. F. III.</i>	Phenolum Iodatum, N. F.
<i>Acidum Carbolicum Liquefactum</i>	Phenol Liquefactum, U. S. P.
<i>Acidum Chromicum</i>	Chromii Trioxidum U. S. P.
<i>Acidum Gallotannicum</i>	Acidum Tannicum, U. S. P.
<i>Acidum Hydrochloratum</i>	Acidum Hydrochloricum, U. S. P.
<i>Acidum Hydrochloratum Dilutum</i>	Acidum Hydrochloricum Dilutum, U. S. P.
<i>Acidum Hydrocyanicum Dilutum (P. I.)</i>	Acidum Hydrocyanicum Dilutum, U. S. P.
<i>Acidum Phosphoricum Glaciale Dilutum</i>	Acidum Metaphosphorium Dilutum, N. F.
III.	
<i>Aconite</i>	Aconitum, U. S. P.
<i>Aconite and Chloroform, Liniment of</i>	Linimentum Aconiti et Chloroformi, N. F.
<i>Aconite, Extract of</i>	Extractum Aconiti, U. S. P.
<i>Aconite, Fleming's Tincture of</i>	Tinctura Aconiti, Fleming, N. F. III.
<i>Aconite, Fluidextract of</i>	Fluidextractum Aconiti, U. S. P.
<i>Aconite Root</i>	Aconitum, U. S. P.
<i>Aconite, Tincture of</i>	Tinctura Aconiti, U. S. P.
<i>Aconitine</i>	Aconitina, U. S. P.
<i>Aconitine, Oleate of</i>	Oleatum Aconitinæ, N. F.
<i>Aconiti Tinctura P. I.</i>	Tinctura Aconiti, U. S. P.
<i>Aconiti Tuber, P. I.</i>	Aconitum, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Actaea, Compound Syrup of.....	Syrupus Cimicifugæ Compositus, N. F.
Adeps Benzoatus.....	Adeps Benzoinatus, U. S. P.
Adeps Lanae Anhydricus.....	Adeps Lanae, U. S. P.
Adeps Suillus.....	Adeps, U. S. P.
Adhesive plaster.....	Emplastrum Resinæ, U. S. P.
Adonis.....	Adonis, N. F.
Adonis, Fluidextract of.....	Fluidextractum Adonidis, N. F.
Adstringent Lotion.....	Lotio Adstringens, N. F. III.
Aether Chloratus.....	Æthylis Chloridum, U. S. P.
Aetheroleum Amygdalæ Amaræ.....	Oleum Amygdalæ Amaræ, U. S. P.
Aetheroleum Anisi.....	Oleum Anisi, U. S. P.
Aetheroleum Carvi.....	Oleum Cari, U. S. P.
Aetheroleum Citri.....	Oleum Limonis, U. S. P.
Aetheroleum Foeniculi.....	Oleum Fœniculi, U. S. P.
Aetheroleum Juniperi.....	Oleum Juniperi, U. S. P.
Aetheroleum Lavandulæ.....	Oleum Lavandulæ Florum, U. S. P.
Aetheroleum Menthæ Piperitæ.....	Oleum Menthæ Piperitæ, U. S. P.
Aetheroleum Rosæ.....	Oleum Rosæ, U. S. P. VIII.
Aetheroleum Rosmarini.....	Oleum Rosmarini, U. S. P.
Aetheroleum Terebinthinæ Crudum.....	Oleum Terebinthinæ, U. S. P.
Aetheroleum Terebinthinæ Rectifica- tum.....	Oleum Terebinthinæ Rectificatum, U. S. P.
Aetheroleum Thymi.....	Oleum Thymi, U. S. P.
Aether Petrolei.....	Benzinum, U. S. P. VIII.
Aether spirituosus.....	Spiritus Ætheris, U. S. P.
African Pepper.....	Capsicum, U. S. P.
Agar-Agar.....	Agar, U. S. P.
Agaric.....	Agaricus, N. F.
Aitken Tonic Pills.....	Pilulæ Ferri, Quininae, Strychninae et Arseni Mitis, N. F.
Albumen, Fresh Egg.....	Ovi Albumen Recens, N. F.
Albuminate of Iron, Solution of.....	Liquor Ferri Albuminati, N. F.
Alcohol.....	Alcohol, U. S. P.
Alcohol Absolutus, U. S. P. VIII.....	Alcohol Dehydratum, U. S. P.
Alcohol, Dehydrated.....	Alcohol Dehydratum, U. S. P.
Alcohol, Diluted.....	Alcohol Dilutum, U. S. P.
Alcoholic Eye-Wash.....	Spiritus Ophthalmicus, N. F. III.
Aleppo Galls.....	Galla, U. S. P.
Aletris.....	Aletris, N. F.
Aletris, Fluidextract of.....	Fluidextractum Aletridis, N. F.
Alkaline Antiseptic Solution.....	Liquor Antisepticus Alkalinus, N. F.
Alkaline Mixture of Rhubarb.....	Mistura Rhei Alkalina, N. F.
Alkaline Solution of Tar.....	Liquor Picis Alkalinus, N. F.
Alkaline Sulphur Ointment.....	Unguentum Sulphuris Alkalinum, N. F.
Allspice.....	Pimenta, N. F.
Almond, Bitter.....	Amygdala Amara, U. S. P. VIII.
Almond, Compound Elixir of.....	Elixir Amygdalæ Compositum, N. F.
Almond, Compound Powder of.....	Pulvis Amygdalæ Compositus, N. F. III.
Almond, Emulsion of.....	Emulsum Amygdalæ, U. S. P.
Almond Oil, Expressed.....	Oleum Amygdalæ Expressum, U. S. P.
Almond, Sweet.....	Amygdala Dulcis, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Almond, Syrup of.....	Syrupus Amygdalæ, U. S. P. VIII.
Almond Water, Bitter.....	Aqua Amygdalæ Amaræ, U. S. P.
<i>Aloes</i>	Aloe, U. S. P.
Aloes and Canella, Powder of.....	Pulvis Aloes et Canellæ, N. F.
Aloes and Myrrh, Tincture of.....	Tinctura Aloes et Myrrhæ, N. F.
Aloes, Compound Decoction of.....	Decoctum Aloes Compositum, N. F. III.
Aloes, Extract of.....	Extractum Aloes, N. F.
Aloes, Pills of.....	Pilulæ Aloes, U. S. P.
Aloes, Tincture of.....	Tinctura Aloes, U. S. P.
<i>Aloin</i>	Aloinum, U. S. P.
Aloin, Pills of.....	See Pills of Aloin.
Alphahydroxypropionic Acid.....	Acidum Lacticum, U. S. P.
<i>Althea</i>	Althæa, U. S. P.
<i>Althea Leaves</i>	Althææ, Folia, N. F.
<i>Alum</i>	Alumen, U. S. P.
Alumen Ustum.....	Alumen Exsiccatum, U. S. P.
Alum, Exsiccated.....	Alumen Exsiccatum, U. S. P.
Aluminum subacetate, Solution of.....	Liquor Alumini Subacetatis, N. F.
Aluminium Sulfuricum.....	Alumini Sulphas, N. F.
Aluminium Acetate, Solution of.....	Liquor Alumini Acetatis, N. F.
Aluminum Acetate, N. F. III, Solution of.	Liquor Alumini Subacetatis, N. F. IV.
Aluminum Acetico-Tartrate, Solution of.	Liquor Alumini Acetico-Tartratis, N. F.
<i>Aluminum Chloride</i>	Alumini Chloridum, N. F.
<i>Aluminum Hydroxide</i>	Alumini Hydroxidum, U. S. P.
<i>Aluminum Sulphate</i>	Alumini Sulphas, N. F.
American Hellebore.....	Veratrum Viride, U. S. P.
American Spikenard.....	Aralia, N. F.
Aminoform.....	Hexamethylenamine, U. S. P.
Ammonaldehyde.....	Hexamethylenamina, U. S. P.
Ammonia, Aromatic Spirit of.....	Spiritus Ammonię Aromaticus, U. S. P.
Ammonia, Anisated Spirit of.....	Spiritus Ammonię Anisatus, N. F.
Ammoniac, Emulsion of.....	Emulum Ammoniaci, N. F. III.
Ammoniac Plaster.....	Emplastrum Ammoniaci, N. F. III.
Ammoniac Plaster with Mercury.....	Emplastrum Ammoniaci cum Hydrargyri, N. F. III.
<i>Ammonia Liniment</i>	Linimentum Ammonię, U. S. P.
Ammoniated Camphor Wash.....	Lotio Ammoniacalis Camphorata, N. F.
Ammoniated Glycyrrhizin.....	Glycyrrhizinum Ammoniatum, U. S. P.
Ammoniated Mercury.....	Hydrargyrum Ammoniatum, U. S. P.
Ammoniated Mercury, Ointment of.....	Unguentum Hydrargyri Ammoniaci, U. S. P.
Ammoniated Tincture of Ergot.....	Tinctura Ergotæ Ammoniaci, N. F.
Ammoniated Tincture of Guaiac.....	Tinctura Guaiaci Ammoniaci, U. S. P.
Ammoniated Tincture of Valerian.....	Tinctura Valerianę Ammoniaci, U. S. P.
<i>Ammonia Water</i>	Aqua Ammonię, U. S. P.
Ammonia Water, Stronger.....	Aqua Ammonię Fortior, U. S. P.
Ammonio-Ferric Citrate.....	Ferri et Ammonii Citras, U. S. P.
Ammonio-Formaldehyde.....	Hexamethylenamine, U. S. P.
Ammonium Acetate, Concentrated Solution of.	Liquor Ammonii Acetatis concentratus, N. F. III.
Ammonium Acetate, Solution of.....	Liquor Ammonii Acetatis, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Ammonium Aceticum Solutum</i>	Liquor Ammonii Acetatis, U. S. P.
<i>Ammonium Benzoate</i>	Ammonii Benzoas, U. S. P.
<i>Ammonium Benzoicum</i>	Ammonii Benzoas, U. S. P.
<i>Ammonium Bromatum</i>	Ammonii Bromidum, U. S. P.
<i>Ammonium Bromide</i>	Ammonii Bromidium, U. S. P.
<i>Ammonium Bromide, Elixir of</i>	Elixir Ammonii Bromidi, N. F.
<i>Ammonium Carbonate</i>	Ammonii Carbonas, U. S. P.
<i>Ammonium Carbonicum</i>	Ammonii Carbonas, U. S. P.
<i>Ammonium Chloratum</i>	Ammonii Chloridum, U. S. P.
<i>Ammonium Chloride</i>	Ammonii Chloridum, U. S. P.
<i>Ammonium Chloride, Mixture of</i>	Mistura Ammonii Chloridi, N. F.
<i>Ammonium Chloride, Troches of</i>	Trochisci Ammonii Chloridi, U. S. P.
<i>Ammonium Citrate, Solution of</i>	Liquor Ammonii Citratis, N. F.
<i>Ammonium Hypophosphite</i>	Ammonii Hypophosphis, N. F.
<i>Ammonium Hypophosphite, Syrup of</i> ...	Syrupus Ammonii Hypophosphitis, N. F.
<i>Ammonium Iodide</i>	Ammonii Iodidum, U. S. P.
<i>Ammonium Iodide, Liniment of</i>	Linimentum Ammonii Iodidi, N. F.
<i>Ammonium Iodatum</i>	Ammonii Iodidum, U. S. P.
<i>Ammonium Phosphate</i>	Ammonii Phosphas, N. F.
<i>Ammonium Salicylate</i>	Ammonii Salicylas, U. S. P.
<i>Ammonium Salicylicum</i>	Ammonii Salicylas, U. S. P.
<i>Ammonium Valerate, Elixir of</i>	Elixir Ammonii Valeratis, N. F.
<i>Ammonium Valerate</i>	Ammonii Valeras, U. S. P.
<i>Ammonium Valerianate</i>	Ammonii Valeras, U. S. P.
<i>Ammonium Valerianate and Quinine, Elixir of</i>	Elixir Ammonii Valerianatis et Quininae, N. F. III.
<i>Amylium Nitrosum</i>	Amylis Nitris, U. S. P.
<i>Amyl Nitrite</i>	Amylis Nitris, U. S. P.
<i>Anethol</i>	Anethol, N. F.
<i>Angelica Fruit</i>	Angelicæ Fructus, N. F.
<i>Angelica Root</i>	Angelicæ Radix, N. F.
<i>Angelica Root, Fluid extract of</i>	Fluid extractum Angelicæ Radicis, N. F.
<i>Animal Charcoal</i>	Carbo Animalis, U. S. P. VIII.
<i>Animal Charcoal, Purified</i>	Carbo Animalis Purificatus, U. S. P. VIII.
<i>Anisated Powder of Rhubarb and Magnesia</i> ...	Pulvis Rhei et Magnesie Anisatus, N. F.
<i>Anisated Solution of Ammonia</i>	Spiritus Ammonii Anisatus, N. F.
<i>Anisated Spirit of Ammonia</i>	Spiritus Ammonii Anisatus, N. F.
<i>Anise</i>	Anisum, U. S. P.
<i>Anise, Elixir of</i>	Elixir Anisi, N. F.
<i>Anise Oil</i>	Oleum Anisi, U. S. F.
<i>Anise, Oil of</i>	Oleum Anisi, U. S. P.
<i>Anise, Spirit of</i>	Spiritus Anisi, U. S. P.
<i>Anise Water</i>	Aqua Anisi, U. S. P.
<i>Antacid Tincture</i>	Tinctura Antacrida, N. F. III.
<i>Anthemis</i>	Anthemis, U. S. P. VIII.
<i>Antidiphtheric Globulins</i>	Serum Antidiphthericum Purificatum, U. S. P.
<i>Antidiphtheric Serum</i>	Serum Antidiphthericum, U. S. P.
<i>Antidiphtheric Serum, Dried</i>	Serum Antidiphthericum Siccum, U. S. P.
<i>Antidotum Arsenici</i>	Ferri Hydroxidum cum Magnesii Oxidi, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Antidyspeptic Pills</i>	<i>Pilulæ Antidyspepticæ</i> , N. F.
<i>Antifebrin</i>	<i>Acetanilidum</i> , U. S. P.
<i>Antifebrinum</i>	<i>Acetanilidum</i> , U. S. P.
<i>Antimonial Powder</i>	<i>Pulvis Antimonialis</i> , N. F.
<i>Antimonium Oxysulphuratum</i>	<i>Antimonium Sulphuratum</i> , N. F.
<i>Antimony and Potassium Tartrate</i>	<i>Antimonii et Potassii Tartaras</i> , U. S. P.
<i>Antimony, Compound Pills of</i>	<i>Pilulæ Antimonii Compositæ</i> , N. F.
<i>Antimonye, Potassium Tartrate</i>	<i>Antimonii et Potassii Tartaras</i> , U. S. P.
<i>Antimony Oxide</i>	<i>Antimonii Oxidum</i> , N. F.
<i>Antimony, Sulphurated</i>	<i>Antimonium Sulphuratum</i> , N. F.
<i>Antimony Sulphide, Purified</i>	<i>Antimonii Sulphidum Purificatum</i> , N. F.
III.	
<i>Antimony, Wine of</i>	<i>Vinum Antimonii</i> , N. F.
<i>Antineuralgic Pills</i>	<i>Pilulæ Antineuralgicæ</i> , N. F. III.
<i>Antiperiodic Pills</i>	<i>Pilulæ Antiperiodicæ</i> , N. F.
<i>Antiperiodicæ Pills without Aloes</i>	<i>Pilulæ Antiperiodicæ Sine Aloe</i> , N. F.
<i>Antiperiodic Tincture</i>	<i>Tinctura Antiperiodica</i> , N. F.
<i>Antiperiodic Tincture without Aloes</i>	<i>Tinctura Antiperiodica, sine Aloe</i> , N. F.
<i>Antiperiodic Tincture, with Aloes</i>	<i>Tinctura Antiperiodica</i> , N. F.
<i>Antipyrine</i>	<i>Antipyrina</i> , U. S. P.
<i>Antiseptic Solution</i>	<i>Liquor Antisepticus</i> , N. F.
<i>Antiseptic Solution, Alkaline</i>	<i>Liquor Antisepticus Alkalinus</i> , N. F.
<i>Antiseptic Solution of Pepsin</i>	<i>Liquor Pepsini Antisepticus</i> , N. F.
<i>Antitetanic Globulins</i>	<i>Serum Antitetanicum Purificatum</i> , U. S. P.
<i>Antitetanic Serum</i>	<i>Serum Antitetanicum</i> , U. S. P.
<i>Antitetanic Serum, Dried</i>	<i>Serum Antitetanicum Siccum</i> , U. S. P.
<i>Antitetanic Serum, Purified</i>	<i>Serum Antitetanicum Purificatum</i> , U. S. P.
<i>Apiol, Liquid</i>	<i>Oleoresina Petroselini</i> , U. S. P.
<i>Apocynum</i>	<i>Apocynum</i> , N. F.
<i>Apocynum, Fluid Extract of</i>	<i>Fluidextractum Apocyni</i> , U. S. P.
<i>Apomorphine Chloride</i>	<i>Apomorphinæ Hydrochloridum</i> , U. S. P.
<i>Apomorphinum Hydrochloricum</i>	<i>Apomorphinæ Hydrochloridum</i> , U. S. P.
<i>Apomorphine Hydrochloride</i>	<i>Apomorphinæ Hydrochloridum</i> , U. S. P.
<i>Apple Juice, Fresh</i>	<i>Succus Pomorum</i> , N. F.
<i>Apples, Ferrated, Extract of</i>	<i>Extractum Ferri Pomatum</i> , N. F.
<i>Apples, Tincture of Ferrated, Extract of</i>	<i>Tinctura Ferri Pomata</i> , N. F.
<i>Aqua Calcariae</i>	<i>Liquor Calcis</i> , U. S. P.
<i>Aqua Fortis</i>	<i>Acidum Nitricum</i> , U. S. P.
<i>Aqua Phagedaenica Flava</i>	<i>Lotio Flava</i> , N. F.
<i>Aqua Plumbi</i>	<i>Liquor Plumbi Subacetatis Dilutus</i> , U. S. P.
<i>Aqua Regia</i>	<i>Acidum Nitrohydrochloridum</i> , U. S. P.
<i>Aqua Sedativa, N. F. III</i>	<i>Lotio Ammoniacalis Camphora</i> , N. F.
<i>Aqueous Elixir of Glycyrrhiza</i>	<i>Elixir Glycyrrhizæ Aqueum</i> , N. F.
<i>Aqueous Elixir of Licorice</i>	<i>Elixir Glycyrrhizæ Aqueum</i> , N. F.
<i>Aqueous Extract of Ergot</i>	<i>Extractum Ergotæ Aqueum</i> , N. F.
<i>Aqueous Fluidextract of Cinchona</i>	<i>Fluidextractum Cinchonæ Aqueum</i> , N. F.
<i>Aqueous Tincture of Rhubarb</i>	<i>Tinctura Rhei Aquea</i> , N. F.
<i>Aqua Saturnina</i>	<i>Liquor Plumbi Subacetatis Dilutus</i> , U. S. P.
<i>Aralia</i>	<i>Aralia</i> , N. F.
<i>Aralia Racemosa, Fluidextract of</i>	<i>Fluidextractum Araliæ Racemosæ</i> , N. F.
<i>Arbor Vitæ</i>	<i>Thuja</i> , N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Argentum Nitricum.....	Argenti Nitras, U. S. P.
Argentum Nitricum Fusum.....	Argenti Nitras Fusus, U. S. P.
Aristolium.....	Thymolis Iodidum, U. S. P.
Arnica.....	Arnica, U. S. P.
Arnica Flowers.....	Arnica, U. S. P.
Arnica, Fluidextract of.....	Fluidextractum Arnicæ, N. F.
Arnica Plaster.....	Emplastrum Arnicæ, N. F. III.
Arnica Root, Extract of.....	Extractum Arnicæ Radicis, N. F. III.
Arnica Root, Fluidextract of.....	Fluidextractum Arnicæ Radicis, N. F. III.
Arnica Root, Tincture of.....	Tinctura Arnicæ Radicis, N. F. III.
Arnica, Tincture of.....	Tinctura Arnicæ, U. S. P.
Aromatic Camphor Mixture.....	Mistura Camphoræ Aromatica, N. F.
Aromatic Castor Oil.....	Oleum Ricini Aromaticum, N. F.
Aromatic Elixir.....	Elixir Aromaticum, U. S. P.
Aromatic Elixir of Eriodictyon.....	Elixir Eriodictyi Aromaticum, N. F.
Aromatic Elixir of Glycyrrhiza.....	Elixir Glycyrrhizæ Aromaticum, N. F.
Aromatic Elixir of Licorice.....	Elixir Glycyrrhizæ Aromaticum, N. F.
Aromatic Elixir of Yerba Santa.....	Elixir Eriodictyi Aromaticum, N. F.
Aromatic Elixir, Red.....	Elixir Aromaticum Rubrum.
Aromatic Fluidextract.....	Fluidextractum Aromaticum, U. S. P.
Aromatic Fluidextract of Cascara Sagrada.....	Fluidextractum Cascaræ Sagradæ Aromaticum, U. S. P.
Aromatic Fluidglycerate of Cascara Sagrada.....	Fluidglyceratum Cascaræ Sagradæ Aromaticum, N. F.
Aromatic Fluidglycerate of Rhamnus Purshian.....	Fluidglyceratum Cascaræ Sagradæ Aromaticum, N. F.
Aromatic Oil Spray.....	Nebula Aromatica, N. F.
Aromatic Pepsin.....	Pepsinum Aromaticum, N. F. III.
Aromatic Plaster.....	Emplastrum Aromaticum, N. F. III.
Aromatic Powder.....	Pulvis Aromaticus, U. S. P.
Aromatic Powder of Chalk.....	Pulvis Cretæ Aromaticus, N. F.
Aromatic Powder of Chalk with Opium.....	Pulvis Cretæ et Opii Aromaticus, N. F.
Aromatic Solution of Pepsin.....	Liquor Pepsini Aromaticus, N. F.
Aromatic Spirit.....	Spiritus Aromaticus, N. F. III.
Aromatic Spirit of Ammonia.....	Spiritus Ammonizæ Aromaticus, U. S. P.
Aromatic Sulphuric Acid.....	Acidum Sulphuricum Aromaticum, U. S. P.
Aromatic Syrup of Eriodictyon.....	Syrupus Eriodictyi Aromaticus, N. F.
Aromatic Syrup of Rhubarb.....	Syrupus Rhei Aromaticus, U. S. P.
Aromatic Syrup of Senna.....	Syrupus Sennæ Aromaticus, N. F.
Aromatic Syrup of Yerba Santa.....	Syrupus Eriodictyi Aromaticus, N. F.
Aromatic Tincture.....	Tinctura Aromatica, N. F.
Aromatic Tincture of Rhubarb.....	Tinctura Rhei Aromatica, U. S. P.
Aromatic Vinegar.....	Acetum Aromaticum, N. F.
Aromatic Waters.....	Aquæ Aromaticæ, U. S. P.
Aromatic Wine of Coca.....	Vinum Cocæ Aromaticum, N. F. III.
Aromatic Wine of Erythroxylon.....	Vinum Cocæ Aromaticum, N. F. III.
Aromatized Iodoform.....	Iodoformum Aromatisatum, N. F.
Arsenate of Iron, Syrup of.....	Syrupus Ferri Arsenatis, N. F. III.
Arsenicalis Liquor Fowleri, P. I.....	Liquor Potassii Arsenitis, U. S. P.
Arsenic Antidote.....	Ferri Hydroxidum cum Magnesii Oxido, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Arsenic Iodide.....	Arseni Iodidum, U. S. P.
Arsenic Trioxide.....	Arseni Trioxidum, U. S. P.
Arsenous Acid.....	Arseni Trioxidum, U. S. P.
Arsenous Acid, Solution of.....	Liquor Acidi Arsenosi, U. S. P.
Arsenous and Mercuric Iodide, Solution of.....	Liquor Arseni et Hydrargyri Iodidi, U. S. P.
Arsenous Iodide.....	Arseni Iodidum, U. S. P.
Arsenous Oxide.....	Arseni Trioxidum, U. S. P.
Artificial Carlsbad Salt.....	Sal Carolinum Factitium, N. F.
Artificial Kissingen Salt.....	Sal Kissingense Factitium, N. F.
Artificial Vichy Salt.....	Sal Vichyanum Factitium, N. F.
Asafetida.....	Asafetida, U. S. P.
Asafetida, Emulsion of.....	Emulsum Asafetidæ, U. S. P.
Asafetida, Pills of.....	Pilulæ Asafetidæ, U. S. P.
Asafetida Plaster.....	Emplastrum Asafetidæ, N. F. III.
Asafetida, Tincture of.....	Tinctura Asafetidæ, U. S. P.
Asa Foetida.....	Asafetida, U. S. P.
Asarum.....	Asarum, N. F.
Asarum, Compound Syrup of.....	Syrupus Asari Compositus, N. F.
Asclepias.....	Asclepias, N. F.
Asclepias, Fluidextractum of.....	Fluidextractum Asclepiadis, N. F.
Aspidium.....	Aspidium, U. S. P.
Aspidosperma.....	Aspidosperma, U. S. P.
Aspidosperma, Fluidextract of.....	Fluidextractum Aspidospermatidis, U. S. P.
Astringent and Escharotic Mixture, N. F.	Mistura Adstringens, N. F.
III.	
Astringent Mixture.....	Mistura Adstringens, N. F.
Atophan.....	Acidum Penylcinchonicum, U. S. P.
Atropine.....	Atropina, U. S. P.
Atropine, Oleate of.....	Oleatum, Atropinæ, N. F.
Atropine Sulphate.....	Atropinæ Sulphas, U. S. P.
Atropinum Sulfuricum.....	Atropinæ Sulphas, U. S. P.
Auro-natrium Chloratum.....	Auri et Sodii Chloridum, U. S. P.
Axungia Benzoata.....	Adeps Benzoinatus, U. S. P.
Axungia Porci.....	Adeps, U. S. P.
Bacca Spinæ Cervinæ.....	Rhamnus Catharticus, N. F.
Balm of Gilead Buds.....	Populi Gemmæ, N. F.
Balsam of Copaiba.....	Copaiba, U. S. P.
Balsam of Peru.....	Balsamum Peruvianum, U. S. P.
Balsam of Tolu.....	Balsamum Tolutanum, U. S. P.
Balsam Poplar Buds.....	Populi Gemmæ, N. F.
Balsam, Styraç.....	Styrax, U. S. P.
Balsamum Copaivæ.....	Copaiba, U. S. P.
Balsamum Tranquillans.....	Oleum Hyocyami Compositum, N. F.
Baptisia.....	Baptisia, N. F.
Baptisia, Fluidextract of.....	Fluidextractum Baptisiz, N. F.
Barker's Post Partum Pills.....	Pilulæ Laxativæ Post Partum, N. F.
Basham's Mixture.....	Liquor Ferri et Ammonii Acetatis, U. S. P.
Basilicon Ointment.....	Ceratum Resinæ, U. S. P.
Bateman's Pectoral Drops.....	Tinctura Pectoralis, N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Battery Fluid</i>	Liquor Electropœicus, N. F. III.
<i>Bearberry</i>	Uva Ursi, U. S. P.
<i>Beef and Iron, Wine of</i>	Vinum Carnis et Ferri, N. F.
<i>Beef and Wine</i>	Vinum Carnis, N. F.
<i>Beef Extract</i>	Extractum Carnis, N. F.
<i>Beef, Iron, and Cinchona, Wine of</i>	Vinum Carnis, Ferri et Cinchonæ, N. F. III.
<i>Beef, Wine, and Iron</i>	Vinum Carnis et Ferri, N. F.
<i>Beef, Wine, Iron, and Cinchona</i>	Vinum Ferri, Carnis et Cinchonæ, N. F. III.
<i>Beef, Wine of</i>	Vinum Carnis, N. F.
<i>Beeswax</i>	Cera Flava, U. S. P.
<i>Belladonnæ Extractum P. I.</i>	Extractum Belladonnæ Foliorum, U. S. P.
<i>Belladonnæ Folium</i>	Belladonnæ Folia, U. S. P.
<i>Belladonnæ Tinctura P. I.</i>	Tinctura Belladonnæ Foliorum, U. S. P.
<i>Belladonna Leaves</i>	Belladonnæ Folia, U. S. P.
<i>Belladonna Leaves, Extract of</i>	Extractum Belladonnæ Foliorum, U. S. P.
<i>Belladonna Leaves, Tincture of</i>	Tinctura Belladonnæ Foliorum, U. S. P.
<i>Belladonna Liniment</i>	Linimentum Belladonnæ, U. S. P.
<i>Belladonna Ointment</i>	Unguentum Belladonnæ, U. S. P.
<i>Belladonna Plaster</i>	Emplastrum Belladonnæ, U. S. P.
<i>Belladonna Root</i>	Belladonnæ Radix, U. S. P.
<i>Belladonna Root, Fluidextract of</i>	Fluidextractum Belladonnæ Radicis, U. S. P.
<i>Benne Oil</i>	Oleum Sesami, U. S. P.
<i>Benzaldehyde</i>	Benzaldehydum, U. S. P.
<i>Benzin, Purified Petroleum</i>	Benzinum Purificatum, U. S. P.
<i>Benzoe</i>	Benzoinum, U. S. P.
<i>Benzoic Acid</i>	Acidum Benzoicum, U. S. P.
<i>Benzoin</i>	Benzoinum, U. S. P.
<i>Benzoinated Lard</i>	Adeps Benzoinatus, U. S. P.
<i>Benzoinated Suet</i>	Sevum Benzoinatum, N. F.
<i>Benzoin, Compound Tincture of</i>	Tinctura Benzoini Composita, U. S. P.
<i>Benzoin, Tincture of</i>	Tinctura Benzoini, U. S. P.
<i>Benzosulphinide</i>	Benzosulphinidum, U. S. P.
<i>Berberis</i>	Berberis, N. F.
<i>Berberis, Fluidextract of</i>	Fluidextractum Berberidis, N. F.
<i>Bestucheff's Tincture</i>	Tinctura Ferri Chloridi Ætherea, N. F.
<i>Betaeucaine Hydrochloride</i>	Betaeucaine Hydrochloridum, U. S. P.
<i>Betanaphthol</i>	Betanaphthol, U. S. P.
<i>Betanaphthol Petrox</i>	Petroxolinum Betanaphtholis, N. F.
<i>Betanaphthol Petrozolin</i>	Petroxolinum Betanaphtholis, N. F.
<i>Beth Root</i>	Trillium, N. F.
<i>Biboras Natricus</i>	Sodii Boras, U. S. P.
<i>Bicarbonas Kalicus</i>	Potassii Bicarbonas, U. S. P.
<i>Bicarbonas Natricus Depuratus</i>	Sodii Bicarbonas, U. S. P.
<i>Bichloride of Mercury</i>	Hydrargyri Chloridum Corrosivum, U. S. P.
<i>Bichloride Tablets</i>	Toxibellæ Hydrargyri Chloridi Corrosivi, U. S. P.
<i>Biniodide of Mercury</i>	Hydrargyri Iodidum Rubrum, U. S. P.
<i>Bismuth Ammonio-Citrate</i>	Bismuthi et Ammonii Citras, U. S. P.
<i>Bismuth and Ammonium Citrate</i>	Bismuthi et Ammonii Citras, U. S. P.
<i>Bismuth Betanaphthol</i>	Bismuthi Betanaphtholas, U. S. P.
<i>Bismuth Citrate</i>	Bismuth Citras, U. S. P. VIII.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Bismuth, Elixir of.....	Elixir Bismuthi, N. F.
Bismuth, Glycerite of.....	Glyceritum Bismuthi, N. F.
Bismuth, Hydrated Oxide of.....	Bismuthi Oxidum Hydratum, N. F. III.
<i>Bismuth Magma</i>	Magma Bismuthi, U. S. P.
Bismuth, Solution of.....	Liquor Bismuthi, N. F.
<i>Bismuth Subcarbonate</i>	Bismuthi Subcarbonas, U. S. P.
<i>Bismuth Subgallate</i>	Bismuthi Subgallas, U. S. P.
<i>Bismuth Subnitrate</i>	Bismuthi Subnitrates, U. S. P.
<i>Bismuth Subsalicylate</i>	Bismuthi Subsalicylas, U. S. P.
Bismutum Subnitricum.....	Bismuthi Subnitrates, U. S. P.
Bismutum Subsalicylicum.....	Bismuthi Subsalicylas, U. S. P.
Bitartaras Kalicus.....	Potassii Bitartaras, U. S. P.
Bitter Almond.....	Amygdala Amara, U. S. P. VIII.
Bitter Almond Oil.....	Oleum Amygdalæ Amaræ, U. S. P.
Bitter Almond, Spirit of.....	Spiritus Amygdalæ Amaræ, U. S. P.
<i>Bitter Almond Water</i>	Aqua Amygdalæ Amaræ, U. S. P.
Bitter Apple.....	Colocynthis, U. S. P.
Bitterless Fluidextract of Cascara Sa- grada.....	Fluidextractum Rhamni Purshianæ Alka- linum, N. F. III.
Bitterless Syrup of Quinidine.....	Syrupus Quinidinæ, N. F.
Bitter Metallic Pills.....	Pilulæ Ferri, Quininæ, Strychninæ et Arseni Fortiores, N. F.
Bitter Orange, Elixir of.....	Elixir Aurantii Amari, N. F.
Bitter Orange, Oil of.....	Oleum Aurantii Amari, N. F.
<i>Bitter Orange Peel</i>	Aurantii Amari, Cortex, U. S. P.
Bitter Orange Peel, Fluidextract of.....	Fluidextractum Aurantii Amari, U. S. P.
Bitter Orange Peel, Tincture of.....	Tinctura Aurantii Amari, U. S. P.
Bitter Stomachic Drops.....	Tinctura Amara, N. F.
<i>Bittersweet</i>	Dulcamara, N. F.
Bittersweet, Fluidextract of.....	Fluidextractum Dulcamaræ, N. F.
<i>Bitter Tincture</i>	Tinctura Amara, N. F.
<i>Bitter Tincture of Zedoary</i>	Tinctura Zedoariæ Amara, N. F.
<i>Bitter Wine of Iron</i>	Vinum Ferri Amarum, N. F.
Bitter Wood.....	Quassia, U. S. P.
<i>Blackberries</i>	Rubi Fructus, N. F.
Blackberry Bark.....	Rubus, N. F.
Blackberry, Compound Elixir of.....	Elixir Rubi Compositum, N. F.
<i>Blackberry Cordial</i>	Cordiale Rubi Fructus, N. F.
Blackberry Fruit, Syrup of.....	Syrupus Rubi Fructus, N. F.
Black Cohosh.....	Cimicifuga, U. S. P.
Black Draught.....	Infusum Sennæ Compositum, U. S. P.
Black Drop.....	Acetum Opii, N. F.
Black Haw.....	Viburnum Prunifolium, U. S. P.
<i>Black Lotion</i>	Lotio Nigra, N. F.
<i>Black Mustard</i>	Sinapis Nigra, U. S. P.
Black Pepper.....	Piper, U. S. P.
Black Snakeroot.....	Cimicifuga, U. S. P.
Black Wash.....	Lotio Nigra, N. F.
Bladderwrack.....	Fucus, N. F.
Blancard's Pills.....	Pilulæ Ferri Iodidi, U. S. P.
Blaud's Pills.....	Pilulæ Ferri Carbonatis, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Bleached Sponge.....	Spongia Decolorata, N. F. III.
Bleaching Powder.....	Calx Chlorinata, U. S. P.
Blistering Cerate.....	Ceratum Cantharidis, U. S. P.
Blistering Collodion.....	Collodion Cantharidatum, U. S. P.
Blood Root.....	Sanguinaria, U. S. P.
Blue Cohosh.....	Caulophyllum, N. F.
<i>Blue Flag</i>	Iris Versicolor, N. F.
Blue Gum Leaves.....	Eucalyptus, U. S. P.
Blue Mass.....	Massa Hydrargyri, U. S. P.
Blue Ointment.....	Unguentum Hydrargyri Dilutum, U. S. P.
Blue Vervain.....	Verbena, N. F.
Blue Vitriol.....	Cupri Sulphas, U. S. P.
<i>Boldo</i>	Boldo, N. F.
Boldo, Fluidextract of.....	Fluidextractum Boldi, N. F.
Boldo Leaves.....	Boldo, N. F.
Boneset.....	Eupatorium, N. F.
Boracic Acid.....	Acidum Boricum, U. S. P.
Borax.....	Sodii Boras, U. S. P.
<i>Boric Acid</i>	Acidum Boricum, U. S. P.
Boric Acid, Ointment of.....	Unguentum Acidi Borici, U. S. P.
Boroglyceride.....	Boroglycerinum, N. F. III.
<i>Boroglycerin</i>	Boroglycerinum, N. F. III.
Boroglycerin, Glycerite of.....	Glyceritum Boroglycerini, U. S. P.
Boro-Salicylated Powder of Talc.....	Pulvis Talci Compositus, N. F.
Boulton's Solution.....	Liquor Iodi Carbolatus, N. F.
<i>Brandy</i>	Spiritus Vini Gallici, U. S. P. VIII.
<i>Brayera</i>	Brayera, N. F.
Brayera, Infusion of.....	Infusum Brayeræ, N. F.
Breast Tea.....	Species Pectorales, N. F.
<i>Bromauric Acid</i>	Acidum Bromauricum, N. F.
Brometum Ammonicum.....	Ammonii Bromidum, U. S. P.
Brometum Kalicum.....	Potassii Bromidum, U. S. P.
Brometum Natricum.....	Sodii Bromidum, U. S. P.
Brometum Scopolamicum.....	Scopolaminæ Hydrobromidum, U. S. P.
Bromide of Iron, Syrup of.....	Syrupus Ferri Bromidi, N. F. III.
Bromides, Syrup of the.....	Syrupus Bromidorum, N. F.
<i>Bromine</i>	Bromum, N. F.
Bromine, Solution of.....	Liquor Bromi, N. F.
<i>Bromoform</i>	Bromoformum, U. S. P.
Bromoformium.....	Bromoformum, U. S. P.
Broom Tops.....	Scoparius, N. F.
Brown Mixture.....	Mistura Glycyrrhizæ Composita, U. S. P.
Brown Mustard.....	Sinapis Nigra, U. S. P.
<i>Brown Ointment</i>	Unguentum Fuscum, N. F.
<i>Bryonia</i>	Bryonia, N. F.
Bryonia, Tincture of.....	Tinctura Bryoniæ, N. F.
Bryony.....	Bryonia, N. F.
<i>Buchu</i>	Buchu, U. S. P.
Buchu and Potassium Acetate, Elixir of.....	Elixir Buchu et Potassii Acetatis, N. F.
Buchu, Compound Elixir of.....	Elixir Buchu Compositum, N. F.
Buchu, Compound Fluidextract of.....	Fluidextractum Buchu Compositum, N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Buchu, Elixir of.....	Elixir Buchu, N. F.
Buchu, Fluidextract of.....	Fluidextractum Buchu, U. S. P.
Buckthorn Bark.....	Frangula, U. S. P.
<i>Buckthorn Berries</i>	Rhamnus Catharticus, N. F.
Bulbus, Scillae.....	Scilla, U. S. P.
Burdock Root.....	Lappa, N. F.
<i>Burgundy Pitch Plaster</i>	Emplastrum Picis Burgundicæ, N. F. III.
Burnt Sugar Coloring.....	Caramel, N. F.
Burrow's Solution.....	Liquor Alumini Acetatis, Crudus, N. F.
Butternut Bark.....	Juglans, N. F.
Butter of Cacao.....	Oleum Theobromatis, U. S. P.
Cacao Butter.....	Oleum Theobromatis, U. S. P.
<i>Cactus Grandiflorus</i>	Cactus Grandiflorus, N. F.
Cactus Grandiflorus, Tincture of.....	Tinctura Cacti Grandiflori, N. F.
Cade Oil.....	Oleum Cadinum, U. S. P.
Cade Petrox.....	Petroxolinum Cadini, N. F.
<i>Cade Petrozolin</i>	Petroxolinum Cadini, N. F.
Caffeine.....	Caffeina, U. S. P.
Caffeine, Citrated.....	Caffeina Citrata, U. S. P.
Caffeine, Effervescent Citrated.....	Caffeina Citrata Effervescens, U. S. P.
Caffeine, Elixir of.....	Elixir Caffeinæ, N. F. III.
<i>Caffeine Sodio-Benzoeate</i>	Caffeinæ Sodio-Benzoeas, U. S. P.
<i>Caffeine Sodio-Salicylate</i>	Caffeinæ Sodio-Salicylas, N. F.
Cajuput Oil.....	Oleum Cajuputi, U. S. P.
Calabar Bean.....	Physostigma, U. S. P.
<i>Calamine Ointment</i>	Unguentum Calaminæ, N. F.
Calamus, Fluidextract of.....	Fluidextractum Calami, U. S. P. VIII.
Calcaria Chlorata.....	Calx Chlorinata, U. S. P.
Calcaria Usta.....	Calx, U. S. P.
Calcined Magnesia.....	Magnesiæ Oxidum, U. S. P.
Calcium and Sodium Glycerophosphates, Elixir of.....	Elixir Calcii et Sodii Glycerophosphatum, N. F.
Calcium and Sodium Hypophosphites, Syrup of.....	Syrupus Calcii and Sodii Hypophosphitum, N. F.
<i>Calcium Bromide</i>	Calcii Bromidum, U. S. P.
Calcium Bromide, Elixir of.....	Elixir Calcii Bromidi, N. F.
Calcium Carbonicum, Præcipitatum.....	Calcii Carbonas Præcipitatus, U. S. P.
<i>Calcium Chloride</i>	Calcii Chloridum, U. S. P.
<i>Calcium Glycerophosphate</i>	Calcii Glycerophosphas, U. S. P.
Calcium Hydrochlorophosphate, Syrup of.....	Syrupus Calcii Hydrochlorophosphatis, N. F.
Calcium Hydroxide, Solution of.....	Liquor Calcis, U. S. P.
Calcium Hydroxide, Syrup of.....	Syrupus Calcis, U. S. P. VIII.
<i>Calcium Hypophosphate</i>	Calcii Hypophosphis, U. S. P.
Calcium Hypophosphite, Elixir of.....	Elixir Calcii Hypophosphitis, N. F.
Calcium Hypophosphite, Syrup of.....	Syrupus Calcii Hypophosphitis, N. F.
Calcium Hypophosphoresum.....	Calcii Hypophosphis, U. S. P.
Calcium Iodide, Syrup of.....	Syrupus Calcii Iodidi, N. F.
<i>Calcium Lactate</i>	Calcii Lactas, U. S. P.
<i>Calcium Lactophosphate</i>	Calcii Lactophosphas, N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Calcium Lactophosphate, Elixir of.....	Elixir Calcii Lactophosphatis, N. F.
Calcium Lactophosphate, Syrup of.....	Syrupus Calcii Lactophosphatis, U. S. P.
Calcium Lactophosphate and Iron, Syrupus Calcii Lactophosphatis et Ferri, Syrup of.....	N. F.
Calcium Oxide.....	Calx, U. S. P.
Calcium Phosphate, Precipitated.....	Calcii Phosphas Præcipitatus, N. F.
Calcium Phosphoricum.....	Calcii Phosphas Præcipitatus, N. F.
Calcium Sulphate, Exsiccated.....	Calcii Sulphas Exsiccatus, U. S. P. VIII.
Calcium Sulphide, Crude.....	Calcii Sulphidum crudum, U. S. P.
Calendula.....	Calendula, N. F.
Calendula, Fluidextract of.....	Fluidextractum Calendulæ, N. F.
Calendula, Tincture of.....	Tinctura Calendulæ, N. F.
Calisaya Bark.....	Cinchona, U. S. P.
Calomel.....	Hydrargyri Chloridum Mite, U. S. P.
Calomel and Jalap.....	Pulvis Hydrargyri Chloridi Mitis et Jalapæ, N. F.
Calumba.....	Calumba, U. S. P.
Calumba, Fluidextract of.....	Fluidextractum Calumbæ, N. F.
Calumba, Tincture of.....	Tinctura Calumbæ, U. S. P.
Calx Chlorata.....	Calx Chlorinata, U. S. P.
Calx Sulphurata, U. S. P. VIII.....	Calcii Sulphidum Crudum, U. S. P.
Camellia, Fluidextract of.....	Fluidextractum Camelliæ, N. F. III.
Camphor.....	Camphora, U. S. P.
Camphor and Chloroform Petrox.....	Petroxolinum Chloroformi Camphoratum, N. F.
Camphor and Menthol.....	Menthol Camphoratum, N. F.
Camphorated Brown Plaster.....	Emplastrum Fuscum Camphoratum, N. F.
Camphorated Chloral.....	Chloral Camphoratum, N. F.
Camphorated Chloroform Petrozolin.....	Petroxolinum Chloroformi Camphoratum, N. F.
Camphorated Menthol.....	Menthol Camphoratum, N. F.
Camphorated Mother Plaster.....	Emplastrum Fuscum Camphoratum, N. F.
Camphorated Oil.....	Linimentum Camphoræ, U. S. P.
Camphorated Phenol Petrox.....	Petroxolinum Phenolis Camphoratum, N. F.
Camphorated Phenol Petrozolin.....	Petroxolinum Phenolis Camphoratum, N. F.
Camphorated Soap Liniment.....	Linimentum Saponato-Camphoratum, N. F.
Camphorated Tincture of Opium.....	Tinctura Opii Camphorata, U. S. P.
Camphor Cerate.....	Ceratum Camphoræ, N. F.
Camphor Cerate, Compound.....	Ceratum Camphoræ Compositum, N. F. III.
Camphor Ice.....	Ceratum Camphoræ Compositum, N. F. III.
Camphor Liniment.....	Linimentum Camphoræ, U. S. P.
Camphor Menthol, N. F. III.....	Menthol Camphoratum, N. F.
Camphor Mixture, Acid.....	Mistura Camphoræ Acida, N. F.
Camphor Mixture, Aromatic.....	Mistura Camphoræ Aromatica, N. F.
Camphor, Monobromated.....	Camphora Monobromata, U. S. P.
Camphor Ointment.....	Unguentum Camphoræ, N. F.
Camphor Wash, Ammoniated.....	Lotio Ammoniacalis Camphora, N. F.
Camphor Water.....	Aqua Camphoræ, U. S. P.
Canada Liniment.....	Linimentum Opii Compositum, N. F.
Canada Pitch Plaster.....	Emplastrum Picis Canadensis, N. F. III.
Canada Turpentine.....	Terebinthina Canadensis, U. S. P. VIII.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Canadian Hemp.....	Apocynum, N. F.
Canadian Snake-Root.....	Asarum, N. F.
Canella.....	Canella, N. F.
Cannabis.....	Cannabis, U. S. P.
Cannabis, Extract of.....	Extractum Cannabis, U. S. P.
Cannabis, Fluidextract of.....	Fluidextractum Cannabis, U. S. P.
Cannabis Indica.....	Cannabis, U. S. P.
Cannabis, Tincture of.....	Tinctura Cannabis, U. S. P.
Cantharidal Collodion.....	Collodium Cantharidatum, U. S. P.
Cantharidal Pitch Plaster.....	Emplastrum Picis Cantharidatum, N. F. III.
Cantharides.....	Cantharis, U. S. P.
Cantharides Cerate.....	Ceratum Cantharidis, U. S. P.
Cantharides, Cerate of Extract of.....	Ceratum Extracti Cantharidis, N. F. III.
Cantharides Liniment.....	Linimentum Cantharidis, N. F. III.
Cantharides Paper.....	Charta Cantharidis, N. F. III.
Cantharides Plaster.....	Emplastrum Cantharidis, U. S. P.
Cantharides, Tincture of.....	Tinctura Cantharidis, U. S. P.
Cantharidis Tinctura, P. I.....	Tinctura Cantharidis, U. S. P.
Cape Aloes.....	Aloes, U. S. P.
Capsicum.....	Capsicum, U. S. P.
Capsicum and Myrrh, Tincture of.....	Tinctura Capsici et Myrrhæ, N. F.
Capsicum, Fluidextract of.....	Fluidextractum Capsici, U. S. P. VIII.
Capsicum, Oleoresin of.....	Oleoresina Capsici, U. S. P.
Capsicum Plaster.....	Emplastrum Capsici, U. S. P.
Capsicum, Tincture of.....	Tinctura Capsici, U. S. P.
Caramel.....	Caramel, N. F.
Caramel, Tincture of.....	Tinctura Caramellis, N. F.
Caraway.....	Carum, U. S. P.
Caraway Oil.....	Oleum Cari, U. S. P.
Carawayseed.....	Carum, U. S. P.
Carbolic Acid.....	Phenol, U. S. P.
Carbolic Acid, Iodized.....	Phenolum Iodatum, N. F.
Carbolic Acid Water.....	Aqua Phenolata, N. F.
Carbolized Oil.....	Oleum Phenolatum, N. F.
Carbolized Solution of Iodine.....	Liquor Iodi Phenolatus, N. F.
Carbo Ligni Pulveratus.....	Carbo Ligni, U. S. P.
Carbonas Calci Præcipitatus.....	Calcii Carbonas Præcipitatus, U. S. P.
Carbonas Kalicus.....	Potassii Carbonas, U. S. P.
Carbonas Lithicus.....	Lithii Carbonas, U. S. P.
Carbonas Natricus.....	Sodii Carbonas Monohydratus, U. S. P.
Carbon Disulphide.....	Carbonei Disulphidum, U. S. P. VIII.
Cardamom, Compound Elixir of.....	Elixir Cardamomi Compositus, N. F.
Cardamom, Compound Spirit of.....	Spiritus Cardamomi Compositus, N. F.
Cardamom, Compound Tincture of.....	Tinctura Cardamomi Composita, U. S. P.
Cardamom Seed.....	Cardamomi Lemen, U. S. P.
Cardamom, Tincture of.....	Tinctura Cardamomi, U. S. P.
Carlsbad Salt, Artificial.....	Sal Carolinum Factitium, N. F.
Carlsbad Salt, Effervescent Artificial.....	Sal Carolini Factitii Effervescens, N. F.
Carminative Mixture.....	Mistura Carminativa, N. F.
Carmine.....	Carminum, N. F.
Carmine, Solution of.....	Liquor Carmini, N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Carrageen.....	Chondrus, U. S. P.
Carron Oil.....	Linimentum Calcis, U. S. P.
Caryophylli.....	Caryophyllus, U. S. P.
Cascara Sagrada.....	Cascara Sagrada, U. S. P.
Cascara Sagrada, Aromatic Fluidextract of.	Fluidextractum Cascaræ Sagradæ Aromaticum, U. S. P.
Cascara Sagrada, Aromatic Fluid-glycerate of.	Fluidglyceratum Cascaræ Aromaticum, N. F.
Cascara Sagrada, Compound Elixir of.....	Elixir Cascaræ Sagradæ Compositum, N. F.
Cascara Sagrada, Elixir of.....	Elixir Cascaræ Sagradæ, N. F.
Cascara Sagrada, Extract of.....	Extractum Cascaræ Sagradæ U. S. P.
Cascara Sagrada, Fluidextract of.....	Fluidextractum Cascaræ Sagradæ, U. S. P.
Cascara Sagrada, Fluidglycerate of.....	Fluidglyceratum Cascaræ Sagradæ, N. F.
Cascarilla.....	Cascarilla, N. F.
Cassia Fistula.....	Cassia Fistula, N. F.
Cassia Oil.....	Oleum Cassiæ, U. S. P.
Castanea.....	Castanea, N. F.
Castor Oil.....	Oleum Ricini, U. S. P.
Castor Oil, Aromatic.....	Oleum Ricini Aromaticum, N. F.
Castor Oil, Emulsion of.....	Emulsum Olei Ricini, N. F.
Cataplasm of Kaolin.....	Cataplasma Kaolini, N. F.
Cataria.....	Cataria, N. F.
Cataria, Fluidextract of.....	Fluidextractum Cataris, N. F.
Catarrh Powder.....	Pulvis Anticatharrhalis, N. F. III.
Catarrh Snuff.....	Pulvis Anticatharrhalis, N. F. III.
Catechu, Compound Tincture of Pale.....	Tinctura Gambir Composita, U. S. P.
Cathartic Pills, Compound.....	Pilulæ Cathartice Compositæ, U. S. P.
Catmint.....	Cataria, N. F.
Catnep.....	Cataria, N. F.
Catnep, Fluidextract of.....	Fluidextractum Cataris, N. F.
Caulophyllum.....	Caulophyllum, N. F.
Caulophyllum, Fluidextract of.....	Fluidextractum Caulophylli, N. F.
Caustic Potash.....	Potassii Hydroxidum, U. S. P.
Caustic Solution of Iodine.....	Liquor Iodi Causticus, N. F. III
Cayenne Pepper.....	Capsicum, U. S. P.
Celery, Compound Elixir of.....	Elixir Apii Graveolentis Compositum, N. F. III.
Celery Fruit.....	Apii Fructus, N. F.
Celery Seed.....	Apii Fructus, N. F.
Celery Seed, Fluidextract of.....	Fluidextractum Apii Graveolentis, N. F.
Centaury.....	Centaurium, N. F.
Cerate.....	Ceratum, U. S. P.
Cerate, Cantharides.....	Ceratum Cantharidis, U. S. P.
Cerate of Extract of Cantharides.....	Ceratum Extracti Cantharidis, N. F. III.
Cerate of Lead Subacetate.....	Ceratum Plumbi Subacetatis, N. F.
Cerate, Rosin.....	Ceratum Resinæ, U. S. P.
Cerate, Rosin Compound.....	Ceratum Resinæ Compositum, N. F.
Cerate, Savine.....	Ceratum Sabinæ, N. F. III.
Cerate, Spermaceti.....	Ceratum Cetacei, N. F.
Cerium Oxalate.....	Cerii Oxalas, U. S. P.
Cetraria, Decoction of.....	Decotum Cetrariæ, N. F. III.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Ceylon Cinnamon</i>	<i>Cinnamomum Zeylancicum</i> , U. S. P.
<i>Chalk, Aromatic Powder of</i>	<i>Pulvis Cretæ Aromaticus</i> , N. F.
<i>Chalk Mixture</i>	<i>Mistura Cretæ</i> , U. S. P.
<i>Chalk, Powder, Compound</i>	<i>Pulvis Cretæ Compositus</i> , U. S. P.
<i>Chalk, Prepared</i>	<i>Creta Præparata</i> , U. S. P.
<i>Chalk, Troches of</i>	<i>Trochisci Cretæ</i> , N. F. III.
<i>Chalk with Opium, Aromatic Powder of</i>	<i>Pulvis Cretæ Aromaticus et Opii</i> , N. F.
<i>Chalybeate Pills</i>	<i>Pilulæ Ferri Carbonatis</i> , U. S. P.
<i>Chamomile, German</i>	<i>Matricaria</i> , U. S. P.
<i>Channing's Solution</i>	<i>Liquor Hydrargyri et Potassii Iodidi</i> , N. F.
<i>Chapman's Dinner Pill</i>	<i>Pilulæ Ad Prandium</i> , N. F.
<i>Chapman's Mixture</i>	<i>Mistura Copaibæ et Opii</i> , N. F.
<i>Charcoal</i>	<i>Carbo Ligni</i> , U. S. P.
<i>Charcoal, Animal</i>	<i>Carbo Animalis</i> , U. S. P. VIII.
<i>Charcoal, Purified Animal</i>	<i>Carbo Animalis Purificatus</i> , U. S. P. VIII.
<i>Charcoal, Troches of</i>	<i>Trochisci Carbonis Ligni</i> , N. F.
<i>Charta Sinapis, U. S. P. VIII</i>	<i>Emplastrum Sinapis</i> , U. S. P.
<i>Chemical Food</i>	<i>Syrupus Phosphatum Compositus</i> , N. F.
<i>Chenopodium, Oil of</i>	<i>Oleum Chenopodii</i> , U. S. P.
<i>Chestnut Leaves</i>	<i>Castanea</i> , N. F.
<i>Chestnut Leaves, Fluidextract of</i>	<i>Fluidextractum Castanææ</i> , N. F.
<i>Chimaphila</i>	<i>Chimaphila</i> , N. F.
<i>Chimaphila, Fluidextract of</i>	<i>Fluidextractum Chimaphilæ</i> , N. F.
<i>Chininum Bisulfuricum</i>	<i>Quininæ Bisulphas</i> , U. S. P.
<i>Chininum Ferro-citricum</i>	<i>Ferri et Quininæ Citras</i> , U. S. P.
<i>Chininum Hydrobromicum</i>	<i>Quininæ Hydrobromidum</i> , U. S. P.
<i>Chininum Hydrochloricum</i>	<i>Quininæ Hydrochloridum</i> , U. S. P.
<i>Chininum Salicylicum</i>	<i>Quininæ Salicylas</i> , U. S. P.
<i>Chininum Sulfuricum</i>	<i>Quininæ Sulphas</i> , U. S. P.
<i>Chininum Tannicum</i>	<i>Quininæ Tannas</i> , U. S. P.
<i>Chionanthus</i>	<i>Chionanthus</i> , N. F.
<i>Chionanthus, Fluidextract of</i>	<i>Fluidextractum Chionanthi</i> , N. F.
<i>Chirata</i>	<i>Chirata</i> , N. F.
<i>Chirata, Fluidextract of</i>	<i>Fluidextractum Chiratæ</i> , N. F.
<i>Chirata, Tincture of</i>	<i>Tinctura Chiratæ</i> , N. F. III.
<i>Chloral</i>	<i>Chloral Hydratum</i> , U. S. P.
<i>Chloral and Bromide Compound</i>	<i>Mistura Chloralis et Potassii Bromidi Composita</i> , N. F.
<i>Chloral and Bromide, Compound Mixture of</i>	<i>Mistura Chloralis et Potassii Bromidi Composita</i> , N. F.
<i>Chloral, Camphorated</i>	<i>Chloral Camphoratum</i> , N. F.
<i>Chloralformamide</i>	<i>Chloralformamidum</i> , U. S. P. VIII.
<i>Chloral Hydrate</i>	<i>Chloralum Hydratum</i> , U. S. P.
<i>Chloral, Hydrated</i>	<i>Chloralum Hydratum</i> , U. S. P.
<i>Chloras Kalicus</i>	<i>Potassii Chloras</i> , U. S. P.
<i>Chloretum Amido-Hydrargyricum</i>	<i>Hydrargyrum Ammoniatum</i> , U. S. P.
<i>Chloretum Ammonicum</i>	<i>Ammonii Chloridum</i> , U. S. P.
<i>Chloretum Apomorphicum</i>	<i>Apomorphinæ Hydrochloridum</i> , U. S. P.
<i>Chloretum Chinicum</i>	<i>Quininæ Hydrochloridum</i> , U. S. P.
<i>Chloretum Cocainum</i>	<i>Cocainæ Hydrochloridum</i> , U. S. P.
<i>Chloretum Ferricum</i>	<i>Ferri Chloridum</i> , U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Chloretum Hydrargyricum Corrosivum...	Hydrargyri Chloridum Corrosivum, U. S. P.
Chloretum Hydrasticum.....	Hydrastininæ Hydrochloridum, U. S. P.
Chloretum Morphicum.....	Morphinæ Hydrochloridum, U. S. P.
Chloretum Natricum.....	Sodii Chloridum, U. S. P.
Chloretum Pilocarpicum.....	Pilocarpinæ Hydrochloridum, U. S. P.
Chloretum Zincicum.....	Zinci Chloridum, U. S. P.
Chloride of Lime.....	Calx Chlorinata, U. S. P.
Chlorinated Lime.....	Calx Chlorinata, U. S. P.
Chlorinated Potassa, Solution of.....	Liquor Potassæ Chlorinatæ, N. F.
Chlorinated Soda, Solution of.....	Liquor Sodæ Chlorinatæ, U. S. P.
Chlorine, Compound Solution of.....	Liquor Chlorig Compositus, N. F.
Chloroform.....	Chloroformum, U. S. P.
Chloroform and Morphine, Compound Mixture of.	Mistura Chloroformi et Morphinæ Composita, N. F.
Chloroform Anodyne.....	Mistura Chloroformi et Morphinæ Composita, N. F.
Chloroform, Compound Elixir of.....	Elixir Chloroformi Compositum, N. F. III.
Chloroformium.....	Chloroformum, U. S. P.
Chloroform Liniment.....	Linimentum Chloroformi, U. S. P.
Chloroform, Spirit of.....	Spiritus Chloroformi, U. S. P.
Chloroform Water.....	Aqua Chloroformi, U. S. P.
Cholera Mixture.....	Mistura contra Diarrhœam, N. F. III.
Chondrus.....	Chondrus, U. S. P.
Chondrus, Compound Syrup of.....	Syrupus Chondri Compositus, N. F. III.
Chondrus Gelatin.....	Gelatinum Chondri, N. F.
Chondrus, Mucilage of.....	Mucilago Chondri, N. F.
Chromic Acid.....	Chromii Trioxidum, U. S. P.
Chromic Anhydride.....	Chromii Trioxidum, U. S. P.
Chromium Trioxide.....	Chromii Trioxidum, U. S. P.
Chrysarobin.....	Chrysarobinum, U. S. P.
Chrysarobin Ointment.....	Unguentum Chrysarobini, U. S. P.
Churchill's Iodine Caustic.....	Liquor Iodi Causticus, N. F. III.
Churchill's Tincture of Iodine.....	Tinctura Iodi Fortior, N. F.
Cimicifuga.....	Cimicifuga, U. S. P.
Cimicifuga, Compound Syrup of.....	Syrupus Cimicifugæ Compositus, N. F.
Cimicifuga, Extract of.....	Extractum Cimicifugæ, U. S. P.
Cimicifuga, Fluidextract of.....	Fluidextractum Cimicifugæ, U. S. P.
Cimicifuga, Tincture of.....	Tinctura Cimicifugæ, N. F.
Cinchona.....	Cinchona, U. S. P.
Cinchona Alkaloids and Hypophosphites, Elixir of.	Elixir Cinchonæ Alkaloidorum et Hypophosphitum, N. F.
Cinchona Alkaloids and Iron, Elixir of.	Elixir Cinchonæ Alkaloidorum et Ferri N. F.
Cinchona Alkaloids, Elixir of.....	Elixir Cinchonæ Alkaloidorum, N. F.
Cinchona Alkaloids, Iron and Bismuth, Elixir of.	Elixir Cinchonæ Alkaloidorum, Ferri et Bismuthi, N. F.
Cinchona Alkaloids, Iron and Calcium Lactophosphate, Elixir of.	Elixir Cinchonæ Alkaloidorum, Ferri et Calcii Lactophosphatis, N. F.
Cinchona Alkaloids, Iron and Pepsin, Elixir of.	Elixir Cinchonæ Alkaloidorum Ferri et Pep-sini, N. F.
Cinchona Alkaloids, Iron and Strychnine, Elixir of.	Elixir Cinchonæ Alkaloidorum et Strychninæ, N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Cinchona Alkaloids, Iron, Bismuth, and Strychnine, Elixir of.	Elixir Cinchonæ Alkaloidorum Ferri Bismuthi et Strychninæ, N. F.
Cinchona Aqueous Fluidextract of.	Fluidextractum Cinchonæ Aqueum, N. F.
Cinchona, Compound Tincture of.	Tinctura Cinchonæ Composita, U. S. P.
Cinchona, Detannated Tincture of.	Tinctura Cinchonæ Detannata, N. F. III.
Cinchona, Extract of.	Extractum Cinchonæ, N. F.
Cinchona, Fluidextract of.	Fluidextractum Cinchonæ, U. S. P.
Cinchona, Infusion of.	Infusum Cinchonæ, N. F.
Cinchona, Pepsin, and Strychnine, Elixir of.	Elixir Cinchonæ, Pepsini et Strychninæ, N. F. III.
Cinchona, Red.	Cinchona Rubra, U. S. P.
Cinchona, Tincture of.	Tinctura Cinchonæ, U. S. P.
Cinchonidine Sulphate.	Cinchonidinæ Sulphas, U. S. P.
Cinchonine Sulphate.	Cinchoninæ Sulphas, U. S. P.
Cineol.	Eucalyptol, U. S. P.
Cinnamic Aldehyde.	Cinnaldehydum, U. S. P. VIII.
Cinnamon, Ceylon.	Cinnamomum Zeylanicum, U. S. P.
Cinnamon, Oil of.	Oleum Cassiæ, U. S. P.
Cinnamon, Saigon.	Cinnamomum Saigonicum, U. S. P.
Cinnamon, Spirit of.	Spiritus Cinnamomi, U. S. P.
Cinnamon, Syrup of.	Syrupus Cinnamomi, N. F.
Cinnamon, Tincture of.	Tinctura Cinnamomi, U. S. P.
Cinnamon Water.	Aqua Cinnamomi, U. S. P.
Citras Ferrico-Ammonicus.	Ferri et Ammonii Citras, U. S. P.
Citras Ferricus cum Chinino.	Ferri et Quininæ Citras, U. S. P.
Citras Natricus.	Sodii Citras, U. S. P.
Citrated Caffeine.	Caffeina Citrata, U. S. P.
Citrate of Iron and Quinine, Effervescent Powder.	Pulvis Ferri et Quininæ Citratis Effervescens, N. F. III.
Citric Acid.	Acidum Citricum, U. S. P.
Citric Acid, Saccharated.	Acidum Citricum Saccharatum, N. F. III.
Citric Acid, Syrup of.	Syrupus Acidi Citrici, U. S. P.
Citrine Ointment.	Unguentum Hydrargyri Nitratis, U. S. P.
Citro-Iodide of Iron, Syrup of.	Syrupus Ferri Citro-Iodidi, N. F. III.
Clarified Honey.	Mel Depuratum, U. S. P.
Clemens' Solution of Arsenic.	Liquor Arsenicalis, Clemens', N. F.
Clove Oil.	Oleum Caryophylli, U. S. P.
Cloves.	Caryophyllus, U. S. P.
Clutterbuck's Elaterin.	Elaterinum, U. S. P.
Coal Tar.	Pix Lithanthracis, N. F.
Coal Tar Solution.	Liquor Picis Carbonis, N. F.
Coca.	Coca, U. S. P. VIII.
Coca and Guarana, Elixir of.	Elixir Cocæ et Guaranæ, N. F. III.
Coca, Elixir of.	Elixir Cocæ, N. F. III.
Coca, Fluidextract of.	Fluidextractum Cocæ, U. S. P. VIII.
Cocaine.	Cocaina, U. S. P.
Cocaine Chloride.	Cocainæ Hydrochloridum, U. S. P.
Cocaine Hydrochloride.	Cocainæ Hydrochloridum, U. S. P.
Cocaine, Oleate of.	Oleatum Cocainæ, N. F.
Cocaine Pencil.	Stilus Cocainæ Dilubilis, N. F. III.
Cocainum Hydrochloricum, P. I.	Cocainæ Hydrochloridum, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Coca, Wine of.....	Vinum Cocæ, U. S. P. VIII.
Coccionella.....	Coccus, U. S. P.
<i>Cocculus Indicus</i>	Cocculus Indicus, N. F.
Cocculus Indicus, Tincture of.....	Tinctura Cocculi Indici, N. F.
Cochia Pills.....	Pilulæ Colocynthidis Compositæ, N. F.
<i>Cochineal</i>	Coccus, U. S. P.
<i>Cochineal Color</i>	Liquor Cocci, N. F.
<i>Cocillana</i>	Cocillana, N. F.
Cocillana, Fluidextract of.....	Fluidextractum Cocillanæ, N. F.
<i>Cocoa</i>	Cacao Præparata, N. F.
<i>Codeine</i>	Codeina, U. S. P.
<i>Codeine Phosphate</i>	Codeinæ Phosphas, U. S. P.
<i>Codeine Sulphate</i>	Codeinæ Sulphas, U. S. P.
Codeine, Syrup of.....	Syrupus Codeinæ, N. F.
Codeinum.....	Codeina, U. S. P.
Codeinum Phosphoricum.....	Codeinæ Phosphas, U. S. P.
<i>Cod Liver Oil</i>	Oleum Morrhue, U. S. P.
Cod Liver Oil, Emulsion of.....	Emulsum Olei Morrhue, U. S. P.
Cod Liver Oil with Calcium and Sodium Phosphates, Emulsion of.....	Emulsum Olei Morrhue cum Calcii et Sodii Phosphatibus, N. F. III.
Cod Liver Oil with Calcium Lactophosphate, Emulsion of.....	Emulsum Olei Morrhue cum Calcii Lactophosphate, N. F.
Cod Liver Oil with Calcium Phosphate, Emulsion of.....	Emulsum Olei Morrhue cum Calcii Phosphate, N. F.
Cod Liver Oil with Egg, Emulsion of.....	Emulsum Olei Morrhue cum Vitello, N. F.
Cod Liver Oil with Extract of Malt, Emulsion of.....	Emulsum Olei Morrhue cum Malto, N. F.
Cod Liver Oil with Hypophosphites, Emulsion of.....	Emulsum Olei Morrhue cum Hypophosphitibus, N. F.
Cod Liver Oil with Wild Cherry, Emulsion of.....	Emulsion Olei Morrhue cum Pruno Virginiana, N. F.
<i>Coffee</i>	Coffea Tosta, N. F.
Coffee, Fluidextract of.....	Fluidextractum Coffeæ, N. F.
Coffee, Syrup of.....	Syrupus Coffeæ, N. F. III.
Coffeinum.....	Caffeina, U. S. P.
Coffeinum Citricum.....	Caffeina Citrata, U. S. P.
Cola.....	Kola, N. F.
<i>Colchicine</i>	Colchicina, U. S. P.
Colchici Tinctura P. I.....	Tinctura Colchici Seminis, U. S. P.
<i>Colchicum Corm</i>	Colchici Cormus, U. S. P.
Colchicum Corm, Extract of.....	Extractum Colchici Cormi, U. S. P.
Colchicum Corm, Fluidextract of.....	Fluidextractum Colchicum Cormi, N. F.
Colchicum Corm, Wine of.....	Vinum Colchici Cormi, N. F.
Colchicum Root.....	Colchici Cormus, U. S. P.
<i>Colchicum Seed</i>	Colchici Semen, U. S. P.
Colchicum Seed, Fluidextract of.....	Fluidextractum Colchici Seminis, U. S. P.
Colchicum Seed, Tincture of.....	Tinctura Colchici Seminis, U. S. P.
Colchicum Seed, Wine of.....	Vinum Colchici Seminis, N. F.
Cole's Dinner Pill.....	Pilulæ Ad Prandium, N. F.
<i>Collodion</i>	Collodium, U. S. P.
Collodion, Cantharidal.....	Collodium Cantharidatum, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Collodion, Compound Salicylic.....	Collodium Salicylici Compositum, N. F.
Collodion, Croton Oil.....	Collodium Tiglii, N. F.
Collodion, Elastic.....	Collodium Flexile, U. S. P.
Collodion, Flexible.....	Collodium Flexile, U. S. P.
Collodion, Iodine.....	Collodium, Iodi, N. F.
Collodion, Iodoform.....	Collodium Iodoformi, N. F.
Collodion, Styptic.....	Collodium, Stypticum, N. F.
Collodion, Vesicans.....	Collodium Cantharidatum, U. S. P.
Colocynth.....	Colocynthis Pulpa, U. S. P.
Colocynth and Hyoscyamus, Pills of.....	Pilulæ Colocynthis et Hyoscyami, N. F.
Colocynth and Podophyllum, Pills of.....	Pilulæ Colocynthis et Podophylli, N. F.
Colocynth Apple.....	Colocynthis, U. S. P.
Colocynth, Compound Extract of.....	Extractum Colocynthis Compositum, U. S. P.
Colocynth, Compound Pills of.....	Pilulæ Colocynthis Compositæ, N. F.
Colocynth, Extract of.....	Extractum Colocynthis, U. S. P.
Colocynth Pulpa.....	Colocynthis, U. S. P.
Colombo.....	Calumba, U. S. P.
Colophonium.....	Resina, U. S. P.
Colophony.....	Resina, U. S. P.
Colless Hydrastine Solution.....	Liquor Hydrastinæ Compositus, N. F.
Coltsfoot.....	Farfara, N. F.
Coltsfoot Leaves.....	Farfara, N. F.
Columba.....	Calumba, U. S. P.
Columbo.....	Calumba, U. S. P.
Commercial Extract of Glycyrrhiza.....	Extractum Glycyrrhizæ, U. S. P.
Composition Powder.....	Pulvis Myricæ Compositus, N. F.
Compound Acetanilid Powder.....	Pulvis Acetanilidi Compositus, N. F.
Compound Anise Powder.....	Pulvis Rhei et Magnesie Anisatus, N. F.
Compound Camphor Cerate.....	Ceratum Camphoræ Compositum, N. F. III.
Compound Cathartic Elixir.....	Elixir Catharticum Compositum, N. F.
Compound Cathartic Pills.....	Pilulæ Catharticæ Compositæ, U. S. P.
Compound Chalk Powder.....	Pulvis Cretæ Compositus, U. S. P.
Compound Croton Oil Liniment.....	Linimentum Tiglii Compositum, N. F.
Compound Digestive Elixir.....	Elixir Digestivum Compositum, N. F. III.
Compound Decoction of Aloes.....	Decoctum Aloes Compositum, N. F. III.
Compound Decoction of Sarsaparilla.....	Decoctum Sarsaparillæ Compositum, N. F.
Compound Effervescent Salt of Potassium Bromide.....	Sal Potassii Bromidi Effervescens Compositus, N. F.
Compound Effervescing Powder.....	Pulvis Effervescens Compositus, U. S. P.
Compound Elixir of Almond.....	Elixir Amygdalæ Compositum, N. F.
Compound Elixir of Blackberry.....	Elixir Rubi Compositum, N. F.
Compound Elixir of Buchu.....	Elixir Buchu Compositum, N. F.
Compound Elixir of Cardamom.....	Elixir Cardamomi Compositum, N. F.
Compound Elixir of Cascara Sagrada.....	Elixir Cascaræ Sagradæ Compositum, N. F.
Compound Elixir of Celery.....	Elixir Apii Graveolentis Compositum, N. F.
III.	
Compound Elixir of Chloroform.....	Elixir Chloroformi Compositum, N. F. III.
Compound Elixir of Corydalis.....	Elixir Corydalis Compositum, N. F.
Compound Elixir of Formates.....	Elixir Formatum Compositum, N. F.
Compound Elixir of Glycerophosphates.....	Elixir Glycerophosphatum Compositum, N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Compound Elixir of Orange.....	Vinum Aurantii Compositum, N. F.
Compound Elixir of Pepsin and Rennin..	Elixir Pepsini et Rennini Compositum, N. F.
Compound Elixir of Quinine.....	Elixir Cinchonæ Alkaloidorum, N. F.
Compound Elixir of Quinine and Phosphates.	Elixir Quininae et Phosphatum Compositum, N. F. III.
Compound Elixir of Sodium Salicylate...	Elixir Sodii Salicylatis Compositus, N. F.
Compound Elixir of Stillingia.....	Elixir Stillingiæ Compositum, N. F. III.
Compound Elixir of Tar.....	Elixir Picis Compositum, N. F. III.
Compound Elixir of Taraxacum.....	Elixir Taraxaci Compositum, N. F.
Compound Elixir of Vanillin.....	Elixir Vanillini Compositum, N. F.
Compound Elixir of Viburnum Opulus...	Elixir Viburni Opuli Compositum, N. F.
Compound Extract of Colocynth.....	Extractum Colocynthis Compositum, U. S. P.
Compound Fluidextract of Buchu.....	Fluidextractum Buchu Compositum, N. F.
Compound Fluid Extract of Sarsaparilla..	Fluidextractum Sarsaparillæ Compositum, U. S. P.
Compound Fluidextract of Stillingia.....	Fluidextractum Stillingiæ Compositum, N. F.
Compound Gargle of Guaiac.....	Gargarisma Guaiaci Composita, N. F.
Compound Infusion of Gentian.....	Infusum Gentianæ Compositum, N. F.
Compound Infusion of Gentian, Stronger.	Infusum Gentianæ Compositum Fortius, N. F. III.
Compound Infusion of Rose.....	Infusum Rosæ Compositum, N. F.
Compound Infusion of Senna.....	Infusum Sennæ Compositum, U. S. P.
Compound Iron Mixture.....	Mistura Ferri Composita, N. F.
Compound Laxative Pills.....	Pilulæ Laxativæ Compositæ, N. F.
Compound Licorice Powder.....	Pulvis Glycyrrhizæ Compositus, U. S. P.
Compound Liniment of Mustard.....	Linimentum Sinapis Compositum, N. F.
Compound Liniment of Opium.....	Linimentum Opii Compositum, N. F.
Compound Liniment of Soft Soap.....	Linimentum Saponis Mollis Compositum, N. F.
Compound Menthol Inunction.....	Inunctum Mentholis Compositum, N. F.
Compound Menthol Spray.....	Nebula Mentholis Composita, N. F.
Compound Mixture of Chloral and Bromide.	Mistura Chlorali et Potassii Bromidi Composita, N. F.
Compound Mixture of Chloroform and Cannabis Indica.	Mistura Chloroformi et Morphinae Composita, N. F.
Compound Mixture of Chloroform and Morphine.	Mistura Chloroformi et Morphinae Composita, N. F.
Compound Mixture of Glycyrrhiza.....	Mistura Glycyrrhizæ Composita, U. S. P.
Compound Mixture of Iron.....	Mistura Ferri Composita, N. F.
Compound Mixture of Opium and Chloroform.	Mistura Opii et Chloroformi Composita, N. F.
Compound Mixture of Opium and Rhubarb.	Mistura Opii et Rhei Composita, N. F.
Compound Mixture of Rhubarb.....	Mistura Rhei Composita, N. F.
Compound Oil of Hyoscyamus.....	Oleum Hyoscyami Compositum, N. F.
Compound Pancreatic Powder.....	Pulvis Pancreatini Compositus, N. F.
Compound Pills of Aloes, Mercury, and Scammony.	Pilulæ Aloes Hydrargyri et Scammonii Compositæ, N. F.
Compound Pills of Aloes and Podophyllum.	Pilulæ Aloes et Podophylli Compositæ, N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Compound Pills of Aloin</i>	<i>Pilulæ Aloini Compositæ, N. F.</i>
<i>Compound Pills of Aloin, Strychnine, and Belladonna.</i>	<i>Pilulæ Aloini, Strychninæ, et Belladonnæ Composita, N. F.</i>
<i>Compound Pills of Antimony</i>	<i>Pilulæ Antimonii Compositæ, N. F.</i>
<i>Compound Pills of Colocynth</i>	<i>Pilulæ Colocyntidis Compositæ, N. F.</i>
<i>Compound Pills of Galbanum</i>	<i>Pilulæ Galbani Compositæ, N. F. III.</i>
<i>Compound Pills of Iron</i>	<i>Pilulæ Ferri Compositæ, N. F. III.</i>
<i>Compound Pills of Rhubarb</i>	<i>Pilulæ Rhei Compositæ, U. S. P.</i>
<i>Compound Powder of Acacia</i>	<i>Pulvis Acaciæ Compositus, N. F. III.</i>
<i>Compound Powder of Almond</i>	<i>Pulvis Amygdalæ Compositus, N. F. III.</i>
<i>Compound Powder of Bayberry</i>	<i>Pulvis Myricæ Compositus, N. F.</i>
<i>Compound Powder of Gambir</i>	<i>Pulvis Gambir Compositus, N. F.</i>
<i>Compound Powder of Glycyrrhiza</i>	<i>Pulvis Glycyrrhizæ Compositus, U. S. P.</i>
<i>Compound Powder of Iodoform</i>	<i>Pulvis Iodoformi Compositus, N. F. III.</i>
<i>Compound Powder of Ipecac</i>	<i>Pulvis Ipecacuanhæ et Opii, U. S. P.</i>
<i>Compound Powder of Jalap</i>	<i>Pulvis Jalapæ Compositus, U. S. P.</i>
<i>Compound Powder of Kino and Opium</i>	<i>Pulvis Kino et Opii Compositus, N. F.</i>
<i>Compound Powder of Morphine</i>	<i>Pulvis Morphinæ Compositus, U. S. P. VIII.</i>
<i>Compound Powder of Pepsin</i>	<i>Pulvis Pepsini Compositus, N. F.</i>
<i>Compound Powder of Rhubarb</i>	<i>Pulvis Rhei Compositus, U. S. P.</i>
<i>Compound Powder of Talc</i>	<i>Pulvis Talcis Compositus, N. F.</i>
<i>Compound Resorcin Ointment</i>	<i>Unguentum Resorcinolis Compositum, N. F.</i>
<i>Compound Resorcinol Ointment</i>	<i>Unguentum Resorcinolis Compositum, N. F.</i>
<i>Compound Rosin Cerate</i>	<i>Ceratum Resinæ Compositum, N. F.</i>
<i>Compound Salicylated Collodion</i>	<i>Collodium Salicylici Compositum, N. F.</i>
<i>Compound Solution of Chlorine</i>	<i>Liquor Chlori Compositus, U. S. P.</i>
<i>Compound Solution of Cresol</i>	<i>Liquor Cresolis Compositus, U. S. P.</i>
<i>Compound Solution of Glycerophosphates.</i>	<i>Elixir Glycerophosphatum Compositum, N. F.</i>
<i>Compound Solution of Hydrastine</i>	<i>Liquor Hydrastinæ Compositus, N. F.</i>
<i>Compound Solution of Hypophosphites</i>	<i>Liquor Hypophosphitum Compositus, N. F.</i>
<i>Compound Solution of Iodine</i>	<i>Liquor Iodi Compositus, U. S. P.</i>
<i>Compound Solution of Sodium Borate</i>	<i>Liquor Sodii Boratis Compositus, N. F.</i>
<i>Compound Solution of Sodium Phosphate</i>	<i>Liquor Sodii Phosphatis Compositus, N. F.</i>
<i>Compound Solution of Zinc and Aluminium.</i>	<i>Liquor Zinci et Alumini Compositus, N. F.</i>
<i>Compound Solution of Zinc and Iron</i>	<i>Liquor Zinci et Ferri Compositus, N. F.</i>
<i>Compound Spirit of Cardamom, N. F. III.</i>	<i>Spiritus Cardamomi Compositus, N. F. III.</i>
<i>Compound Spirit of Cardamom</i>	<i>Spiritus Cardamomi Compositus, N. F.</i>
<i>Compound Spirit of Ether</i>	<i>Spiritus Ætheris Compositus, N. F.</i>
<i>Compound Spirit of Juniper</i>	<i>Spiritus Juniperi Compositus, U. S. P.</i>
<i>Compound Spirit of Myrcia</i>	<i>Spiritus Myrciæ Compositus, N. F.</i>
<i>Compound Spirit of Orange</i>	<i>Spiritus Aurantii Compositus, U. S. P.</i>
<i>Compound Spirit of Vanillin</i>	<i>Spiritus Vanillini Compositus, N. F.</i>
<i>Compound Sulphurated Petrox</i>	<i>Petroxolinum Sulphurata Compositum, N. F.</i>
<i>Compound Sulphurated Petrolin</i>	<i>Petroxolinum Sulphurata Compositum, N. F.</i>
<i>Compound Sulphur Ointment</i>	<i>Unguentum Sulphuris Compositum, N. F.</i>
<i>Compound Syrup of Actæa</i>	<i>Syrupus Cimicifugæ Compositus, N. F.</i>
<i>Compound Syrup of Asarum</i>	<i>Syrupus Asari Compositus, N. F.</i>
<i>Compound Syrup of Canada Snake-root</i>	<i>Syrupus Asari Compositus, N. F.</i>
<i>Compound Syrup of Chondrus</i>	<i>Syrupus Chondri Compositus, N. F.</i>

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Compound Syrup of Cimicifuga</i>	<i>Syrupus Cimicifugæ Compositus</i> , N. F.
<i>Compound Syrup of Figs</i>	<i>Syrupus Ficorum Compositus</i> , N. F.
<i>Compound Syrup of Hydrochlorophosphates</i>	<i>Syrupus Phosphatum cum Quininæ et Strychninæ</i> , N. F.
<i>Compound Syrup of Irish Moss</i>	<i>Syrupus Chondri Compositus</i> , N. F. III.
<i>Compound Syrup of Morphine</i>	<i>Syrupus Morphinæ Compositus</i> , N. F. III.
<i>Compound Syrup of Phosphates with Quinine and Strychnine</i>	<i>Syrupus Phosphatum cum Quininæ et Strychninæ</i> , N. F.
<i>Compound Syrup of Sarsaparilla</i>	<i>Syrupus Sarsaparillæ Compositus</i> , U. S. P.
<i>Compound Syrup of Senna</i>	<i>Syrupus Sennæ Compositus</i> , N. F.
<i>Compound Syrup of Squill</i>	<i>Syrupus Scillæ Compositus</i> , U. S. P.
<i>Compound Syrup of Stillingia</i>	<i>Syrupus Stillingiæ Compositus</i> , N. F.
<i>Compound Syrup of the Phosphates</i>	<i>Syrupus Phosphatum Compositus</i> , N. F.
<i>Compound Syrup of White Pine</i>	<i>Syrupus Pini Strobi Compositus</i> , N. F.
<i>Compound Syrup of White Pine with Morphine</i>	<i>Syrupus Pini Strobi Compositus, cum Morphina</i> , N. F.
<i>Compound Tar Plaster</i>	<i>Emplastrum Picis Liquidæ Compositum</i> , N. F. III.
<i>Compound Tar Ointment</i>	<i>Unguentum Picis Compositum</i> , N. F.
<i>Compound Tincture of Benzoin</i>	<i>Tinctura Benzoini Composita</i> , U. S. P.
<i>Compound Tincture of Cardamom</i>	<i>Tinctura Cardamomi Composita</i> , U. S. P.
<i>Compound Tincture of Cinchona</i>	<i>Tinctura Cinchonæ Composita</i> , U. S. P.
<i>Compound Tincture of Cudbear</i>	<i>Tinctura Persionis Composita</i> , N. F.
<i>Compound Tincture of Gambir</i>	<i>Tinctura Gambir Composita</i> , U. S. P.
<i>Compound Tincture of Gentian</i>	<i>Tinctura Gentianæ Composita</i> , U. S. P.
<i>Compound Tincture of Green Soap</i>	<i>Tinctura Saponis Viridis Composita</i> , N. F. III.
<i>Compound Tincture of Guaiac</i>	<i>Tinctura Guaiaci Composita</i> , N. F.
<i>Compound Tincture of Jalap</i>	<i>Tinctura Jalapæ Composita</i> , N. F.
<i>Compound Tincture of Kino</i>	<i>Tinctura Kino et Opii Composita</i> , N. F.
<i>Compound Tincture of Kino and Opium</i>	<i>Tinctura Kino et Opii Composita</i> , N. F.
<i>Compound Tincture of Lavender</i>	<i>Tinctura Lavandulæ Composita</i> , U. S. P.
<i>Compound Tincture of Pale Catechu</i>	<i>Tinctura Gambir Composita</i> , U. S. P.
<i>Compound Tincture of Vanillin</i>	<i>Tinctura Vanillini Composita</i> , N. F. III.
<i>Compound Tincture of Viburnum</i>	<i>Tinctura Viburni Opuli Composita</i> , N. F.
<i>Compound Tincture of Zedoary</i>	<i>Tinctura Zedoariæ Amara</i> , N. F.
<i>Compound Wine of Rhubarb</i>	<i>Vinum Rhei Compositum</i> N. F.
<i>Compound Wine of Orange</i>	<i>Vinum Aurantii Compositum</i> , N. F.
<i>Compressed Sponge</i>	<i>Spongia Compressa</i> , N. F. III.
<i>Compressed Yeast</i>	<i>Cerevisiæ Fermentum Compressum</i> , N. F.
<i>Concentrated Diphtheria Antitoxin</i>	<i>Serum Antidiphthericum Purificatum</i> , U. S. P.
<i>Concentrated Solution of Ammonium Acetate</i>	<i>Liquor Ammonii Acetatis Concentratus</i> , N. F. III.
<i>Concentrated Tetanus Antitoxin</i>	<i>Serum Antitetanicum Purificatum</i> , U. S. P.
<i>Condurango</i>	<i>Condurango</i> , N. F.
<i>Condurango, Fluidextract of</i>	<i>Fluidextractum Condurango</i> , N. F.
<i>Confection of Rose</i>	<i>Confectio Rosæ</i> , N. F.
<i>Confection of Senna</i>	<i>Confectio Sennæ</i> , N. F.
<i>Conium</i>	<i>Conium</i> , N. F.
<i>Conium, Extract of</i>	<i>Extractum Conii</i> , N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Conium, Fluidextract of.....	Fluidextractum Conii, N. F.
Conium, Tincture of.....	Tinctura Conii, N. F. III.
Convallaria Flowers.....	Convallariæ Flores, N. F.
Convallaria Flowers, Fluidextract of.....	Fluidextractum Convallariæ Florum, N. F.
Convallaria, Fluidextract of.....	Fluidextractum Convallariæ Radicis, N. F.
Convallaria Root.....	Convallariæ Radix, N. F.
Convallaria Root, Fluidextract of.....	Fluidextractum Convallariæ Radicis, N. F.
Copaiba.....	Copaiba, U. S. P.
Copaiba and Opium, Mixture of.....	Mistura Copaibæ et Opii, N. F.
Copaiba, Mass of.....	Massa Copaibæ, N. F.
Copaiba Mixture.....	Mistura Copaibæ, N. F.
<i>Copaiba Mixtures, N. F. III:</i>	
1. Lafayette Mixture.....	Mistura Copaibæ, N. F.
2. Chapman's Mixture.....	Mistura Copaibæ et Opii, N. F.
Copaiba, Oil of.....	Oleum Copaibæ, U. S. P. VIII.
Copaiva.....	Copaiba, U. S. P.
Copper Sulphate.....	Cupri Sulphas, U. S. P.
Coptis.....	Coptis, N. F.
Coptis, Fluidextract of.....	Fluidextractum Coptis, N. F.
Cordial, Blackberry.....	Cordiale Rubi Fructus, N. F.
Coriander.....	Coriandrum, U. S. P.
Coriander Oil.....	Oleum Coriandri, U. S. P.
Coriander Seed.....	Coriandrum, U. S. P.
Corn Collodion.....	Collodium Salicylici Compositum, N. F.
Corn Silk.....	Zea, N. F.
Corn Starch.....	Amylum, U. S. P.
Cornus.....	Cornus, N. F.
Cornus Circinata, Fluidextract of.....	Fluidextractum Cornus Circinatæ, N. F.
III.	
Cornus Fluidextract of.....	Fluidextractum Corni, N. F.
Corrosive Mercuric Chloride.....	Hydrargyri Chloridum Corrosivum, U. S. P.
Corrosive Mercuric Chloride Mull.....	Mulla Hydrargyri Chloridi Corrosivi, N. F.
Corrosive Mercuric Chloride Salve Mull.....	Mulla Hydrargyri Chloridi Corrosivi, N. F.
Corrosive Sublimate.....	Hydrargyri Chloridum Corrosivum, U. S. P.
Corrosive Sublimate Tablets.....	Toxibellæ Hydrargyri Chloridi Corrosivi, U. S. P.
Cortex Aurantii Fructus.....	Auranti Amari Cortex, U. S. P.
Cortex Chinae.....	Cinchona, U. S. P.
Cortex Cinnamomi.....	Cinnamomum Saigonicum, U. S. P.
Cortex Cinnamomi Ceylanici.....	Cinnamomum Zeylanicum, U. S. P.
Cortex Frangulae.....	Frangula, U. S. P.
Cortex Granati.....	Granatum, U. S. P.
Cortex Rhamni Purshianae.....	Cascara Sagrada, U. S. P.
Cortex Viburni.....	Viburnum Prunifolium, U. S. P.
Corydalis.....	Corydalis, N. F.
Corydalis, Compound Elixir of.....	Elixir Corydalis Compositum, N. F.
Corydalis, Fluidextract of.....	Fluidextractum Corydalis, N. F.
Cotarnine Chloride.....	Cotarninæ Hydrochloridum, U. S. P.
Cotarnine Hydrochloride.....	Cotarninæ Hydrochloridum, U. S. P.
Coto, Fluidextract of.....	Fluidextractum Coto, N. F. III.
Cotton, Purified.....	Gossypium Purificatum, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Cotton Root Bark</i>	<i>Gossypii Cortex</i> , N. F.
<i>Cotton Root Bark, Fluidextract of</i>	<i>Fluidextractum Gossypii Corticis</i> , N. F.
<i>Cottonseed Oil</i>	<i>Oleum Gossypii Seminis</i> , U. S. P.
<i>Couch Grass</i>	<i>Triticum</i> , U. S. P.
<i>Coumarin</i>	<i>Coumarinum</i> , N. F.
<i>Cow's Milk</i>	<i>Lac Vaccinum</i> , N. F.
<i>Cox's Hive Syrup</i>	<i>Syrupus Scillæ Compositus</i> , N. F.
<i>Cramp Bark</i>	<i>Viburnum Opulus</i> , N. F.
<i>Cranebill</i>	<i>Geranium</i> , N. F.
<i>Cream of Tartar</i>	<i>Potassii Bitartras</i> , U. S. P.
<i>Creasote</i>	<i>Creosotum</i> , U. S. P.
<i>Creosotal</i>	<i>Creosoti Carbonas</i> , U. S. P.
<i>Creosote</i>	<i>Creosotum</i> , U. S. P.
<i>Creosote Carbonate</i>	<i>Creosoti Carbonas</i> , U. S. P.
<i>Creosote Petrox</i>	<i>Petroxolinum Creosoti</i> , N. F.
<i>Creosote Petrozolin</i>	<i>Petroxolinum Creosoti</i> , N. F.
<i>Creosote-Salicylic Acid Salve Mull</i>	<i>Mulla Creosoti Salicylata</i> , N. F.
<i>Creosote Water</i>	<i>Aqua Creosoti</i> , U. S. P.
<i>Cresol</i>	<i>Cresol</i> , U. S. P.
<i>Cresol, Compound Solution of</i>	<i>Liquor Cresolis Compositus</i> , U. S. P.
<i>Cresol, Saponated Tincture of</i>	<i>Tinctura Cresoli Saponata</i> , N. F. III.
<i>Cresolum Crudum</i>	<i>Cresol</i> , U. S. P.
<i>Crocus</i>	<i>Crocus</i> , N. F.
<i>Croton Oil</i>	<i>Oleum Tiglii</i> , U. S. P.
<i>Croton Oil Collodion</i>	<i>Collodium Tiglii</i> , N. F.
<i>Croton Oil, Compound Liniment of</i>	<i>Linimentum Tiglii Compositum</i> , N. F.
<i>Croton Oil, Liniment of</i>	<i>Linimentum Tiglii</i> , N. F.
<i>Crude Calcium Sulphide</i>	<i>Calcii Sulphidum Crudum</i> , U. S. P.
<i>Crude Malate of Iron</i>	<i>Extractum Ferri Pomatum</i> , N. F.
<i>Crude solution of Aluminum Acetate</i> , N. F. III.	<i>Liquor Alumnii Acetatis, Crudus</i> , N. F.
<i>Cubeb</i>	<i>Cubeba</i> , U. S. P.
<i>Cubeb, Fluid extract of</i>	<i>Fluidextractum Cubebæ</i> , N. F.
<i>Cubeb Oil</i>	<i>Oleum Cubebæ</i> , U. S. P.
<i>Cubeb, Oleoresin of</i>	<i>Oleoresina Cubebæ</i> , U. S. P.
<i>Cubebæ</i>	<i>Cubeba</i> , U. S. P.
<i>Cubeb, Tincture of</i>	<i>Tinctura Cubebæ</i> , N. F.
<i>Cubeb, Troches of</i>	<i>Trochisci Cubebæ</i> , U. S. P.
<i>Cudbear</i>	<i>Persio</i> , N. F.
<i>Cudbear, Compound Tincture of</i>	<i>Tinctura Persionis Composita</i> , N. F.
<i>Cudbear, Tincture of</i>	<i>Tinctura Persionis</i> , N. F.
<i>Culver's Root</i>	<i>Leptandra</i> , N. F.
<i>Cupric Sulphate</i>	<i>Cupri Sulphas</i> , U. S. P.
<i>Cuprum Sulfuricum</i>	<i>Cupri Sulphas</i> , U. S. P.
<i>Curaçao Aloe</i>	<i>Aloe</i> , U. S. P.
<i>Curaçao Cordial</i>	<i>Elixir Curassao</i> , N. F. III.
<i>Curaçao, Elixir of</i>	<i>Elixir Curassao</i> , N. F. III.
<i>Curaçao, Spirit of</i>	<i>Spiritus Curassao</i> , N. F. III.
<i>Curled Dock</i>	<i>Rumex</i> , N. F.
<i>Cusso</i>	<i>Brayera</i> , N. F.
<i>Cydonium, Mucilage of</i>	<i>Mucilago Cydonii</i> , N. F. III.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Cypripedium</i>	Cypripedium, N. F.
Cypripedium, Fluidextract of.....	Fluidextractum Cypripedii, N. F.
Cystamin.....	Hexamethylenamina, U. S. P.
Cystogen.....	Hexamethylenamina, U. S. P.
Dalby's Carminative.....	Mistura Carminativa, N. F.
<i>Damiana</i>	Damiana, N. F.
Damiana, Fluidextract of.....	Fluidextractum Damianæ, N. F.
Dandelion.....	Taraxacum, U. S. P.
Deadly Nightshade.....	Belladonnæ Folia, U. S. P.
Deadly Nightshade Root.....	Belladonnæ Radix, U. S. P.
<i>Decolorized Sponge</i>	Spongia Decolorata, N. F. III.
<i>Decolorized Tincture of Iodine</i>	Tinctura iodi Decolorata, N. F.
Decoction of Aloes, Compound.....	Decoctum Aloes, Compositum, N. F. III.
<i>Decoction of Cetraria</i>	Decoctum Cetrariæ, N. F. III.
<i>Decoctions</i>	Decocta, U. S. P.
<i>Dehydrated Alcohol</i>	Alcohol Dehydratum, U. S. P.
Deodorant Solution.....	Liquor Zinci et Ferri Compositum, N. F.
<i>Deodorized Opium</i>	Opium deodoratum, U. S. P.
Deodorized Opium, Tincture of.....	Tinctura Opii Deodorati, U. S. P.
Dermatol.....	Bismuthi Subgallus, U. S. P.
<i>Dermatologic Pastes</i>	Pastæ Dermatologicæ, N. F.
<i>Dermatologic Pastes, N. F. III:</i>	
Lassar's Mild Resorcin Paste.....	Pasta Resorcinolis Mitis, N. F.
Lassar's Naphthol Paste.....	Pasta Betanaphtholis, N. F.
Lassar's Zinc-Salicyl Paste.....	Pasta Zinci, N. F.
Unna's Soft Zinc Paste.....	Pasta Zinci Mollis, N. F.
Unna's Sulphurated Zinc Paste.....	Pasta Zinci Sulphurata, N. F.
Deahler's Salve.....	Ceratum Reine Compositum, N. F.
<i>Desiccated Hypophysis</i>	Hypophysis Sicca, U. S. P.
Desiccated Pituitary Body.....	Hypophysis Sicca, U. S. P.
Desiccated Suprarenal Glands.....	Suprarenalum Siccum, U. S. P.
Desiccated Thyroid Glands.....	Thyroideum Siccum, U. S. P.
<i>Detannated Tincture of Cinchona</i>	Tinctura Cinchonæ Detannata, N. F. III.
Dewees' Carminative.....	Mistura Magnesie Asafœtidæ et Opii, N. F.
Dewee's Tincture of Guaiac.....	Tinctura Guaiaci Composita, N. F.
<i>Dextrinated Paste</i>	Pasta Dextrinata, N. F.
Dextrin, Mucilage of.....	Mucilago Dextrinita, N. F. III.
Dextrin, White.....	Dextrinum Album, N. F.
<i>Diacetylmorphine</i>	Diacetylmorphina, U. S. P.
Diacetylmorphine Chloride.....	Diacetylmorphinæ Hydrochloridum, U. S. P.
<i>Diacetylmorphine Hydrochloride</i>	Diacetylmorphinæ Hydrochloridum, U. S. P.
<i>Diachylon Ointment</i>	Unguentum Diachylon, U. S. P.
<i>Diarrhoea Mixtures</i>	Misturæ Contra Diarrhœam, N. F. III.
1. Sun Cholera Mixture.....	Mistura Opii Composita, N. F.
2. Squibb's Diarrhoea Mixture.....	Mistura Opii et Chloroformi Composita, N. F.
<i>Diastase</i>	Diastasum, U. S. P.
Digestive Elixir, Compound.....	Elixir Digestivum Compositum, N. F. III.
<i>Digitalis</i>	Digitalis, U. S. P.
Digitalis, Extract of.....	Extractum Digitalis, U. S. P. VIII.
Digitalis, Fluidextract of.....	Fluidextractum Digitalis, U. S. P.
Digitalis, Infusion of.....	Infusum Digitalis, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

• Digitalis, Squills and Mercury, Pills of	Pilulæ Digitalis, Scillæ et Hydrargyri, N. F.
Digitalis, Tinctura P. I.	Tinctura Digitalis, U. S. P.
Digitalis, Tincture of	Tinctura Digitalis, U. S. P.
Diluted Acetic Acid	Acidum Aceticum Dilutum, U. S. P.
Diluted Alcohol	Alcohol Dilutum, U. S. P.
Diluted Glacial Phosphoric Acid	Acidum Metaphosphoricum Dilutum, N. F.
III.	
Diluted Hydriodic Acid	Acidum Hydriodicum Dilutum, U. S. P.
Diluted Hydrobromic Acid	Acidum Hydrobromicum Dilutum, U. S. P.
Diluted Hydrochloric Acid	Acidum Hydrochloricum Dilutum, U. S. P.
Diluted Hydrocyanic Acid	Acidum Hyoscyanicum Dilutum, U. S. P.
Diluted Hypophosphorous Acid	Acidum Hypophosphorosum Dilutum, U. S. P.
Diluted Iodine Petroxolinum	Petroxolinum Iodi Dilutum, N. F.
Diluted Mercurial Ointment	Unguentum Hydrargyri Dilutum, U. S. P.
Diluted Metaphosphoric Acid	Acidum Metaphosphoricum Dilutum, N. F.
III.	
Diluted Nitric Acid	Acidum Nitricum Dilutum, U. S. P. VIII.
Diluted Nitrohydrochloric Acid	Acidum Nitrohydrochloricum Dilutum, U. S. P.
Diluted Nitromuriatic Acid	Acidum Nitrohydrochloricum Dilutum, U. S. P.
Diluted Phosphoric Acid	Acidum Phosphoricum Dilutum, U. S. P.
Diluted Solution of Lead Subacetate	Liquor Plumbi Subacetatis Dilutus, U. S. P.
Diluted Sulphuric Acid	Acidum Sulphuricum Dilutum, U. S. P.
Dimethyl-Ketone	Acetonum, U. S. P.
Dimethyl-xanthine	Theophyllina, U. S. P.
Dinner Pills	Pilulæ Ad Prandium, N. F.
Dionin	Æthylmorphinæ Hydrochloridum, U. S. P.
Dioscorea	Dioscorea, N. F.
Dioscorea, Fluidextract of	Fluidextractum Dioscoreæ, N. F.
Diphtheria Antitoxin	Serum Antidiphthericum, U. S. P.
Diphtheric Antitoxin Globulins	Serum Antidiphthericum Purificatum, U. S. P.
Distilled Water	Aqua Destillata, U. S. P.
Distilled Water, Sterilized	Aqua Destillata Sterilisata, U. S. P.
Diuretin	Theobrominæ Sodio-Salicylas, U. S. P.
Dobell's Solution	Liquor Sodii Boratis Compositus, N. F.
Dog Grass	Triticum, U. S. P.
Dog-Wood Bark	Cornus, N. F.
Donovan's Solution	Liquor Arseni et Hydrargyri Iodidi, U. S. P.
Dover's Powder	Pulvis Ipecacuanahæ et Opii, U. S. P.
Dover's Powder, Tincture of	Tinctura Ipecacuanahæ et Opii, N. F.
Dried Antidiphtheric Serum	Serum Antidiphthericum Siccum, U. S. P.
Dried Antitetanic Serum	Serum Antitetanicum Siccum, U. S. P.
Dried Ferrous Sulphate	Ferri Sulphas Exsiccatus, U. S. P.
Dried Diphtheria Antitoxin	Serum Antidiphthericum Siccum, U. S. P.
Dried Sodium Carbonate	Sodii Carbonas Exsiccatus, N. F. III.
Dried Suprarenals	Suprarenalum Siccum, U. S. P.
Dried Tetanus Antitoxin	Serum Antitetanicum Siccum, U. S. P.
Dried Thyroids	Thyroidæum Siccum, U. S. P.
Drop Chalk	Creta Præparata, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Drosera</i>	<i>Drosera</i> , N. F.
<i>Drosera</i> , Fluidextract of.....	<i>Fluidextractum Droseræ</i> , N. F.
<i>Dwarf Pine Oil</i>	<i>Oleum Pini Pumilionis</i> , U. S. P.
<i>Dysmenorrhœa Mixture</i>	<i>Tinctura Antacrida</i> , N. F. III.
<i>East India Kino</i>	<i>Kino</i> , U. S. P.
<i>Eau Sedative de Raspail</i>	<i>Aqua Sedativa</i> , N. F. III.
<i>Eau Sedative Raspail</i>	<i>Lotio Ammoniacalis Camphora</i> , N. F.
<i>Echinacea</i>	<i>Echinacea</i> , N. F.
<i>Echinacea</i> , Fluidextract of.....	<i>Fluidextractum Echinacæ</i> , N. F.
<i>Effervescent Artificial Carlsbad Salt</i>	<i>Sal Carolini Factitium Effervescens</i> , N. F.
<i>Effervescent Artificial Kissingen Salt</i>	<i>Sal Kissingense Factitium Effervescens</i> , N. F.
<i>Effervescent Artificial Vichy Salt</i>	<i>Sal Vichyani Factitium Effervescens</i> , N. F.
<i>Effervescent Artificial Vichy Salt with Lithium</i> .	<i>Sal Vichyani Factitium Effervescens cum Lithio</i> , N. F.
<i>Effervescent Citrated Caffeine</i>	<i>Caffeina Citrata Effervescens</i> , U. S. P.
<i>Effervescent Citrate of Iron and Quinine</i> .	<i>Pulvis Ferri et Quininæ Citratis Effervescens</i> , N. F. III.
<i>Effervescent Magnesium Citrate</i>	<i>Magnesi Citras Effervescens</i> , N. F. III.
<i>Effervescent Magnesium Sulphate</i>	<i>Magnesi Sulphas Effervescens</i> , U. S. P. VIII.
<i>Effervescent Phosphate of Iron</i>	<i>Pulvis Ferri Phosphatis Effervescens</i> N. F. III.
<i>Effervescent Potassium Bromide with Caffeine</i> .	<i>Sal Potassii Bromidi Effervescens Compositus</i> , N. F.
<i>Effervescent Potassium Citrate</i>	<i>Potassii Citras Effervescens</i> , U. S. P.
<i>Effervescent Powder of Citrate of Iron and Quinine</i> .	<i>Pulvis Ferri et Quininæ Citratis Effervescens</i> , N. F. III.
<i>Effervescent Powder of Ferric Phosphate</i> ...	<i>Pulvis Ferri Phosphatis Effervescens</i> , N. F. III.
<i>Effervescent Salt of Lithium Citrate</i>	<i>Sal Lithii Citras Effervescens</i> , N. F.
<i>Effervescent Salt of Potassium Bromide</i> ...	<i>Sal Potassii Bromidi Effervescens</i> , N. F.
<i>Effervescent Sodium Phosphate</i>	<i>Sodii Phosphas Effervescens</i> , U. S. P.
<i>Effervescent Solution of Magnesium Sulphate</i> .	<i>Liquor Magnesi Sulphatis</i> , Effervescens, N. F.
<i>Effervescent Solution of Sodium Citro-Tartrate</i> .	<i>Liquor Sodii Citro-Tartratis Effervescens</i> , N. F.
<i>Effervescing Powder, Compound</i>	<i>Pulvis Effervescens Compositus</i> , U. S. P.
<i>Egg Albumen, Fresh</i>	<i>Ovi Albumen Recens</i> , N. F.
<i>Egg, Hen's</i>	<i>Ovum Gallinaceum</i> , N. F.
<i>Egg Yolk, Fresh</i>	<i>Ovi Vitellum Recens</i> , N. F.
<i>Eisenzucker</i>	<i>Ferri Oxidum Saccharatum</i> , N. F.
<i>Elaeosacchara</i>	<i>Oleosacchara</i> , N. F.
<i>Elaterin</i>	<i>Elaterinum</i> , U. S. P.
<i>Elaterin, Trituration of</i>	<i>Trituratio Elaterini</i> , U. S. P.
<i>Elder Flowers</i>	<i>Sambucus</i> , N. F.
<i>Elecampane</i>	<i>Inula</i> , N. F.
<i>Elixirs</i>	<i>Elixiria</i> , N. F.
<i>Elixir Adjuvans</i> , U. S. P. VIII.....	<i>Elixir Glycyrrhizæ</i> , U. S. P.
<i>Elixir Aromatic</i>	<i>Elixir Aromaticum</i> , U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Elixir Aurantiorum Compositum.....	Vinum Aurantii Compositum, N. F.
Elixir Calisaya.....	Elixir Cinchonæ Alkaloidorum, N. F.
Elixir Calisaya, Alkaloidal, with Iron and Strychnine.	Elixir Cinchonæ Alkaloidorum et Strychninæ, N. F.
Elixir, Cathartic Compound.....	Elixir Catharticum Compositum, N. F.
Elixir Cinchona Alkaloids, Iron, Bismuth and Strychnine.	Elixir Cinchonæ Alkaloidorum Ferri Bismuthi et Strychninæ, N. F.
Elixir Cinchonæ, N. F. III.....	Elixir Cinchonæ Alkaloidorum, N. F.
Elixir Cinchonæ et Hypophosphitum, N. F. III.	Elixir Cinchonæ Alkaloidorum et Hypophosphitum, N. F.
Elixir Cinchonæ Ferri, Bismuthi et Strychninæ, N. F. III.	Elixir Cinchonæ Alkaloidorum Ferri Bismuthi et Strychninæ, N. F.
Elixir Cinchonæ Ferri et Bismuthi.....	Elixir Cinchonæ Alkaloidorum, Ferri et Bismuthi, N. F.
Elixir Cinchonæ, Ferri et Calcii Lactophosphatis, N. F. III.	Elixir Cinchonæ Alkaloidorum Ferri et Calcii Lactophosphatis, N. F.
Elixir Cinchonæ, Ferri et Pepsini, N. F. III.	Elixir Cinchonæ Alkaloidorum Ferri et Pepsini, N. F.
Elixir Cinchonæ Ferri et Strychninæ, N. F. III.	Elixir Cinchonæ Alkaloidorum et Strychninæ, N. F.
Elixir, Compound Digestive.....	Elixir Digestivum Compositum, N. F. III.
Elixir Corrigens.....	Elixir Eriodictyi Aromaticum, N. F.
Elixir Curassao.....	Elixir Aurantii Amari, N. F.
Elixir Erythroxylon.....	Elixir Cocæ, N. F. III.
Elixir Gentianæ Ferratum, N. F. III....	Elixir Gentianæ et Ferri Phosphatis, N. F.
Elixir Glycerophosphatum, N. F. III....	Elixir Calcii et Sodii Glycerophosphatum, N. F.
Elixir of Ammonium Bromide.....	Elixir Ammonii Bromidi, N. F.
Elixir of Ammonium Valerate.....	Elixir Ammonii Valeratis, N. F.
Elixir of Ammonium Valerianate and Quinine.	Elixir Ammonii Valerianatis et Quininæ, N. F. III.
Elixir of Anise.....	Elixir Anisi, N. F.
Elixir of Bismuth.....	Elixir Bismuthi, N. F.
Elixir of Bitter Orange.....	Elixir Aurantii Amari, N. F.
Elixir of Black Haw.....	Elixir Viburni Prunifolii, N. F.
Elixir of Buchu.....	Elixir Buchu, N. F.
Elixir of Buchu and Potassium Acetate....	Elixir Buchu et Potasii Acetatis, N. F.
Elixir of Buckthorn.....	Elixir Frangulæ, N. F. III.
Elixir of Caffeine.....	Elixir Caffeinæ, N. F. III.
Elixir of Calcium and Sodium Glycerophosphates.	Elixir Calcii et Sodii Glycerophosphatum, N. F.
Elixir of Calcium Bromide.....	Elixir Calcii Bromidi, N. F.
Elixir of Calcium Hypophosphite.....	Elixir Calcii Hypophosphitis, N. F.
Elixir of Calcium Lactophosphate.....	Elixir Calcii Lactophosphatis, N. F.
Elixir of Calisaya, Alkaloidal.....	Elixir Cinchonæ Alkaloidorum, N. F.
Elixir of Calisaya, Alkaloidal, with Hypophosphites.	Elixir Cinchonæ Alkaloidorum et Hypophosphitum, N. F.
Elixir of Calisaya, Alkaloidal, with Iron and Bismuth.	Elixir Cinchonæ Alkaloidorum, Ferri et Bismuthi, N. F.
Elixir of Calisaya, Alkaloidal, with Iron, Bismuth, and Strychnine.	Elixir Cinchonæ Alkaloidorum, Ferri Bismuthi et Strychninæ, N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Elixir of Calisaya and Hypophosphites...	Elixir Cinchonæ Alkaloidorum et Hypophosphitum, N. F.
Elixir of Calisaya and Iron.....	Elixir Cinchonæ Alkaloidorum et Ferri, N. F.
Elixir of Calisaya, Iron, and Bismuth....	Elixir Cinchonæ Alkaloidorum et Bismuthi, N. F.
Elixir of Calisaya, Iron, and Lactophosphate of Lime.	Elixir Cinchonæ Alkaloidorum Ferri et Calcii Lactophosphatis, N. F.
Elixir of Calisaya, Iron, and Pepsin.....	Elixir Cinchonæ Alkaloidorum Ferri et Pepsini, N. F.
Elixir of Calisaya, Iron, and Strychnine..	Elixir Cinchonæ Alkaloidorum Ferri et Strychninæ, N. F.
Elixir of Calisaya, Iron, Bismuth, and Strychnine.	Elixir Cinchonæ Alkaloidorum Ferri Bismuthi et Strychninæ, N. F.
Elixir of Calisaya, Pepsin, and Strychnine.	Elixir Cinchonæ Pepsini et Strychninæ, N. F. III.
<i>Elixir of Cascara Sagrada</i>	<i>Elixir Cascaræ Sagradæ</i> , N. F.
Elixir of Celery Compound.....	Elixir Apii Graveolentis Compositum, N. F. III.
Elixir of Chloroform, Compound.....	Elixir Chloroformi Compositum, N. F. III.
<i>Elixir of Cinchona</i> , N. F. III.....	Elixir Cinchonæ Alkaloidorum, N. F.
<i>Elixir of Cinchona Alkaloids</i>	Elixir Cinchonæ Alkaloidorum, N. F..
<i>Elixir of Cinchona Alkaloids and Hypophosphites</i> .	Elixir Cinchonæ Alkaloidorum et Hypophosphitum, N. F.
<i>Elixir of Cinchona Alkaloids and Iron</i>	Elixir Cinchonæ Alkaloidorum et Ferri, N. F.
<i>Elixir of Cinchona Alkaloids, Iron, and Bismuthi</i> .	Elixir Cinchonæ Alkaloidorum Ferri et Bismuthi, N. F.
<i>Elixir of Cinchona Alkaloids, Iron, and Calcium Lactophosphate</i> .	Elixir Cinchonæ, Alkaloidorum Ferri et Calcii Lactophosphatis, N. F.
<i>Elixir of Cinchona Alkaloids, Iron, and Pepsin</i> .	Elixir Cinchonæ Alkaloidorum Ferri et Pepsini, N. F.
<i>Elixir of Cinchona Alkaloids, Iron, and Strychnine</i> .	Elixir Cinchonæ Alkaloidorum et Strychninæ, N. F.
<i>Elixir of Cinchona and Hypophosphites</i> , N. F. III.	Elixir Cinchonæ Alkaloidorum et Hypophosphitum, N. F.
<i>Elixir of Cinchona and Iron</i> , N. F. III..	Elixir Cinchonæ Alkaloidorum et Ferri, N. F.
<i>Elixir of Cinchona, Iron, and Bismuth</i> , N. F. III.	Elixir Cinchonæ Alkaloidorum et Bismuthi, N. F.
<i>Elixir of Cinchona, Iron, and Calcium Lactophosphate</i> , N. F. III.	Elixir Cinchonæ Alkaloidorum Ferri et Calcii Lactophosphatis, N. F.
<i>Elixir of Cinchona, Iron, and Pepsin</i> , N. F. III.	Elixir Cinchonæ Alkaloidorum Ferri et Pepsini, N. F.
<i>Elixir of Cinchona, Iron, and Strychnine</i> , N. F. III.	Elixir Cinchonæ Alkaloidorum Ferri et Strychninæ, N. F.
<i>Elixir of Cinchona, Iron, Bismuth, and Strychnine</i> .	Elixir Cinchonæ Alkaloidorum Ferri Bismuthi et Strychninæ, N. F.
<i>Elixir of Cinchona, Pepsin, and Strychnine</i> .	Elixir Cinchonæ Pepsini et Strychninæ, N. F. III.
<i>Elixir of Coca</i>	<i>Elixir Cocæ</i> , N. F. III.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Elixir of Coca and Guarana</i>	<i>Elixir Cocæ et Guaranae</i> , N. F. III.
<i>Elixir of Curaçao</i>	<i>Elixir Curassao</i> , N. F. III.
<i>Elixir of Damiana</i>	<i>Elixir Turneræ</i> , N. F. III.
<i>Elixir of Erythroxyton</i>	<i>Elixir Cocæ</i> , N. F. III.
<i>Elixir of Erythroxyton and Guarana</i>	<i>Elixir Cocæ et Guaranae</i> , N. F. III.
<i>Elixir of Eucalyptus</i>	<i>Elixir Eucalypti</i> , N. F. III.
<i>Elixir of Euonymus</i>	<i>Elixir Euonymi</i> , N. F. III.
<i>Elixir of Ferric Hypophosphite</i>	<i>Elixir Ferri Hypophosphitis</i> , N. F.
<i>Elixir of Ferric Phosphate</i>	<i>Elixir Ferri Phosphatis</i> , N. F.
<i>Elixir of Ferric Pyrophosphate</i>	<i>Elixir Pyrophosphatis</i> , N. F.
<i>Elixir of Formates</i>	<i>Elixir Formatum</i> , N. F.
<i>Elixir of Frangula</i>	<i>Elixir Frangulæ</i> , N. F. III.
<i>Elixir of Gentian</i>	<i>Elixir Gentianæ</i> , N. F.
<i>Elixir of Gentian and Ferric Phosphate</i>	<i>Elixir Gentianæ et Ferri Phosphatis</i> , N. F.
<i>Elixir of Gentian and Iron</i>	<i>Elixir Gentianæ et Ferri</i> , N. F.
<i>Elixir of Gentian with Tincture of Fer- ric Citro Chloride</i>	<i>Elixir Gentianæ et Ferri</i> , N. F.
<i>Elixir of Glycerophosphates</i> , N. F. III....	<i>Elixir Calcii et Sodii Glycerophosphatum</i> , N. F.
<i>Elixir of Glycyrrhiza</i>	<i>Elixir Glycyrrhizæ</i> , U. S. P.
<i>Elixir of Glycyrrhiza</i> , N. F.....	<i>Elixir Glycyrrhizæ</i> , N. F. III.
<i>Elixir of Guarana</i>	<i>Elixir Guaranae</i> , N. F.
<i>Elixir of Grindelia</i>	<i>Elixir Grindeliæ</i> , N. F. III.
<i>Elixir of Hops</i>	<i>Elixir Humuli</i> , N. F.
<i>Elixir of Hypophosphites</i>	<i>Elixir Hypophosphitum</i> , N. F.
<i>Elixir of Hypophosphites and Iron</i>	<i>Elixir Hypophosphitum et Ferri</i> , N. F.
<i>Elixir of Iron Lactate</i>	<i>Elixir Ferri Lactatis</i> , N. F.
<i>Elixir of Iron, Quinine, and Strychnine</i>	<i>Elixir Ferri Quininæ et Strychninæ</i> , N. F.
<i>Elixir Jaborandi</i>	<i>Elixir Pilocarpi</i> , N. F. III.
<i>Elixir of Licorice</i>	<i>Elixir Glycyrrhizæ</i> , U. S. P.
<i>Elixir of Licorice</i> , N. F.....	<i>Elixir Glycyrrhizæ</i> , N. F. III.
<i>Elixir of Lithium Bromide</i>	<i>Elixir Lithii Bromidi</i> , N. F.
<i>Elixir of Lithium Citrate</i>	<i>Elixir Lithii Citratis</i> , N. F.
<i>Elixir of Malt and Iron</i>	<i>Elixir Malti et Ferri</i> , N. F. III.
<i>Elixir of Lithium Salicylate</i>	<i>Elixir Lithii Salicylatis</i> , N. F.
<i>Elixir of Paraldehyde</i>	<i>Elixir Paraldehydi</i> , N. F. III.
<i>Elixir of Pepsin</i>	<i>Elixir Pepsini</i> , N. F.
<i>Elixir of Pepsin and Bismuth</i>	<i>Elixir Pepsini et Bismuthi</i> , N. F.
<i>Elixir of Pepsin and Iron</i>	<i>Elixir Pepsini et Ferri</i> , N. F.
<i>Elixir of Pepsin, Bismuth, and Strychnine</i>	<i>Elixir Pepsini, Bismuthi et Strychninæ</i> , N. F.
<i>Elixir of Phosphorus</i>	<i>Elixir Phosphori</i> , N. F.
<i>Elixir of Phosphorus and Nux Vomica</i>	<i>Elixir Phosphori et Nucis Vomicae</i> , N. F.
<i>Elixir of Pilocarpus</i>	<i>Elixir Pilocarpi</i> , N. F. III.
<i>Elixir of Potassium Acetate</i>	<i>Elixir Potassii Acetatis</i> , N. F.
<i>Elixir of Potassium Acetate and Juniper</i>	<i>Elixir Potassii Acetatis et Juniperi</i> , N. F.
<i>Elixir of Potassium Bromide</i>	<i>Elixir Potassii Bromidi</i> , N. F.
<i>Elixir of Pyrophosphate of Iron, Quinine, and Strychnine</i>	<i>Elixir Ferri Pyrophosphatis Quininæ et Strychninæ</i> , N. F.
<i>Elixir of Quinine and Phosphates</i>	<i>Elixir Quininæ et Phosphatum Composi- tum</i> , N. F. III.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Elixir of Quinine, Valerate, and Strychnine.</i>	Elixir Quininæ Valeratis et Strychninæ, N. F.
<i>Elixir of Rhamnus Purshiana, N. F. III.</i>	Elixir Cascaræ Sagradæ, N. F.
<i>Elixir of Rhubarb.....</i>	Elixir Rhei, N. F. III.
<i>Elixir of Rhubarb and Magnesia.....</i>	Elixir Rhei et Magnesii Acetatis, N. F. III.
<i>Elixir of Rhubarb and Magnesium Acetate.....</i>	Elixir Rhei et Magnesii Acetatis, N. F. III.
<i>Elixir of Salicylic Acid.....</i>	Elixir Acidi Salicylici, N. F. III.
<i>Elixir of Sodium Bromide.....</i>	Elixir Sodii Bromidi, N. F.
<i>Elixir of Sodium Hypophosphite.....</i>	Elixir Sodii Hypophosphitis, N. F.
<i>Elixir of Sodium Salicylate.....</i>	Elixir Sodii Salicylatis, N. F.
<i>Elixir of Stillingia, Compound.....</i>	Elixir Stillingiæ Compositum, N. F. III.
<i>Elixir of Strychnine Valerate.....</i>	Elixir Strychninæ Valeratis, N. F.
<i>Elixir of Strychnine Valerianate, N. F.</i>	Elixir Strychninæ Valeratis, N. F.
III.	
<i>Elixir of Tar, Compound.....</i>	Elixir Picis Compositum, N. F. III.
<i>Elixir of Terpin Hydrate.....</i>	Elixir Terpini Hydratis, N. F.
<i>Elixir of Terpin Hydrate and Codeine.....</i>	Elixir Terpini Hydratis et Codeinæ, N. F.
<i>Elixir of Terpin Hydrate and Diacetylmorphine.</i>	Elixir Terpini Hydratis et Diacetylmorphinæ, N. F.
<i>Elixir of Terpin Hydrate with Heroin, N. F. III.</i>	Elixir Terpini Hydratis et Diacetylmorphinæ, N. F.
<i>Elixir of the Phosphates of Iron, Quinine, and Strychnine.</i>	Elixir Ferri Quininæ et Strychninæ Phosphatum, U. S. P. VIII.
<i>Elixir of Three Bromides.....</i>	Elixir Trium Bromidorum, N. F.
<i>Elixir of Turnera.....</i>	Elixir Turnere, N. F. III.
<i>Elixir of Viburnum Prunifolium.....</i>	Elixir Viburni Prunifolii, N. F.
<i>Elixir of Wahoo.....</i>	Elixir Euonymi, N. F. III.
<i>Elixir of Zinc Valerate.....</i>	Elixir Zinci Valeratis, N. F.
<i>Elixir Quininæ Valerianatis et Strychninæ, N. F. III.</i>	Elixir Quininæ Valeratis et Strychninæ, N. F.
<i>Elixir, Red Aromatic.....</i>	Elixir Aromaticum Rubrum, N. F.
<i>Elixir Rhamni Purshianæ, N. F. III.</i>	Elixir Cascaræ Sagradæ, N. F.
<i>Elixir Rhamni Purshianæ Compositum, N. F. III.</i>	Elixir Cascaræ Sagradæ Compositum, N. F.
<i>Elixir Rhei et Magnesiae.....</i>	Elixir Rhei et Magnesii Acetatis, N. F. III.
<i>Elixir Zinci Valerianatis, N. F. III.</i>	Elixir Zinci Valeratis, N. F.
<i>Elm.....</i>	Ulmus, U. S. P.
<i>Elm Bark.....</i>	Ulmus, U. S. P.
<i>Elm, Mucilage of.....</i>	Mucilago Ulmi, U. S. P. VIII.
<i>Elm, Troches of.....</i>	Trochisci Ulmi, N. F.
<i>Emetine Hydrochloride.....</i>	Emetinæ Hydrochloridum, U. S. P.
<i>Emollient Cataplasm.....</i>	Species Emollientes, N. F.
<i>Emollient Species.....</i>	Species Emollientes, N. F.
<i>Emplastrum Aromaticum, N. F. III.</i>	Pulvis Aromaticus Rubefaciens, N. F.
<i>Emulsions.....</i>	Emulsa, N. F.
<i>Emulsion of Almond.....</i>	Emulsum Amygdalæ, U. S. P.
<i>Emulsion of Ammoniac.....</i>	Emulsum Ammoniaci, N. F. III.
<i>Emulsion of Asafetida.....</i>	Emulsum Asafetidæ, U. S. P.
<i>Emulsion of Castor Oil.....</i>	Emulsum Olei Ricini, N. F.
<i>Emulsion of Chloroform.....</i>	Emulsum Chloroformi, U. S. P. VIII.
<i>Emulsion of Cod Liver Oil.....</i>	Emulsum Olei Morrhue, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Emulsion of Cod-Liver Oil with Calcium and Sodium Phosphates.</i>	Emulsum Olei Morrhue cum Calcii et Sodii Phosphatibus, N. F. III.
<i>Emulsion of Cod Liver Oil with Calcium Lactophosphate.</i>	Emulsum Olei Morrhue cum Calcii Lactophosphate, N. F.
<i>Emulsion of Cod Liver Oil with Calcium Phosphate.</i>	Emulsum Olei Morrhue cum Calcii Phosphate, N. F.
<i>Emulsion of Cod Liver Oil with Egg.....</i>	Emulsum Olei Morrhue cum Vitello, N. F.
<i>Emulsion of Cod Liver Oil with Extract of Malt, N. F. III.</i>	Emulsum Olei Morrhue cum Malto, N. F.
<i>Emulsion of Cod Liver Oil with Hypophosphites.</i>	Emulsum Olei Morrhue cum Hypophosphitibus, N. F.
<i>Emulsion of Cod Liver Oil with Malt.....</i>	Emulsum Olei Morrhue cum Malto, N. F.
<i>Emulsion of Cod Liver Oil with Wild Cherry.</i>	Emulsum Olei Morrhue cum Pruno Virginiana, N. F.
<i>Emulsion of Oil of Turpentine.....</i>	Emulsum Olei Terebinthinæ, U. S. P.
<i>Emulsion of Petrolatum.....</i>	Emulsum Petrolati, N. F.
<i>Emulsion of Petroleum, N. F. III.....</i>	Emulsum Petrolati, N. F.
<i>Emulsio Olei Jecoris Aselli.....</i>	Emulsum Olei Morrhue, U. S. P.
<i>Emulsum Petrolei, N. F. III.....</i>	Emulsum Petrolati, N. F.
<i>Epsom Salt.....</i>	Magnesii Sulphas, U. S. P.
<i>Ergot.....</i>	Ergota, U. S. P.
<i>Ergot, Ammoniated Tincture of.....</i>	Tinctura Ergotæ Ammoniata, N. F.
<i>Ergot, Aqueous Extract of.....</i>	Extractum Ergotæ, Aqueum, N. F.
<i>Ergot, Fluidextract of.....</i>	Fluidextractum Ergotæ, U. S. P.
<i>Ergotin, P. I.....</i>	Extractum Ergotæ Aqueum, N. F.
<i>Ergot of Rye.....</i>	Ergota, U. S. P.
<i>Erigeron, Oil of.....</i>	Oleum Erigerontis, U. S. P. VIII.
<i>Eriodictyon.....</i>	Eriodictyon, U. S. P.
<i>Eriodictyon, Aromatic Elixir of.....</i>	Elixir Eriodictyon Aromaticum, N. F.
<i>Eriodictyon, Aromatic Syrup of.....</i>	Syrupus Eriodictyi Aromaticus, N. F.
<i>Eriodictyon, Fluidextract of.....</i>	Fluidextractum Eriodictyi, U. S. P.
<i>Eserine Salicylate.....</i>	Physostigminæ Salicylas, U. S. P.
<i>Essence of Lemon.....</i>	Spiritus Limonis, N. F. III.
<i>Essence of Nutmeg.....</i>	Spiritus Myristicæ, N. F. III.
<i>Essence of Peppermint.....</i>	Spiritus Menthæ Piperitæ, U. S. P.
<i>Essence of Pepsin, N. F. III.....</i>	Elixir Pepsini et Renini Compositum N. F.
<i>Essence of Wintergreen.....</i>	Spiritus Gaultheriæ, U. S. P. VIII.
<i>Essentia Pepsini, N. F. III.....</i>	Elixir Pepsini et Rennini Compositum, N. F.
<i>Ether.....</i>	Æther, U. S. P.
<i>Ether, Compound Spirit of.....</i>	Spiritus Ætheris Compositus, N. F.
<i>Ethereal Oil.....</i>	Oleum Æthereum, N. F.
<i>Ethereal Tincture of Ferric Chloride.....</i>	Tinctura Ferri Chloridi Ætherea, N. F.
<i>Ethereal Tincture of Tolu.....</i>	Tinctura Tolutanæ Ætherea, N. F. III.
<i>Ethereal Tinctures.....</i>	Tincturæ Ætheræ, N. F.
<i>Ether, Spirit of.....</i>	Spiritus Ætheris, U. S. P.
<i>Ethyl Acetate.....</i>	Æther Aceticus, N. F.
<i>Ethyl Carbamate.....</i>	Æthylis Carbamas, U. S. P.
<i>Ethyl Chloride.....</i>	Æthylis Chloridum, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Ethylmorphine Chloride.....	Æthylmorphinæ Hydrochloridum, U. S. P.
<i>Ethylmorphine Hydrochloride</i>	Æthylmorphinæ Hydrochloridum, U. S. P.
Eucaine.....	Betæucainæ Hydrochloridum, U. S. P.
Eucaine Chloride.....	Betæucainæ Hydrochloridum, U. S. P.
<i>Eucalyptol</i>	Eucalyptol, U. S. P.
Eucalyptol Petrox.....	Petroxolinum Eucalyptolis, N. F.
<i>Eucalyptol Petrozolin</i>	Petroxolinum Eucalyptolis, N. F.
<i>Eucalyptol Spray</i>	Nebula Eucalyptolis, N. F.
<i>Eucalyptus</i>	Eucalyptus, U. S. P.
Eucalyptus, Elixir of.....	Elixir Eucalypti, N. F. III.
Eucalyptus, Fluidextract of.....	Fluidextractum Eucalypti, U. S. P.
Eucalyptus Oil.....	Oleum Eucalypti, U. S. P.
<i>Eugenol</i>	Eugenol, U. S. P.
<i>Euonymus</i>	Euonymus, N. F.
Euonymus, Elixir of.....	Elixir Euonymi, N. F. III.
Euonymus, Extract of.....	Extractum Euonymi, U. S. P.
Euonymus, Fluidextract of.....	Fluidextractum Euonymi, N. F.
<i>Eupatorium</i>	Eupatorium, N. F.
Eupatorium, Fluidextract of.....	Fluidextractum Eupatorii, N. F.
<i>Euphorbia Pilulifera</i>	Euphorbia Pilulifera, N. F.
Euphorbia Pilulifera, Fluidextract of.....	Fluidextractum Euphorbiæ Piluliferæ, N. F.
European Goat's Rue.....	Galega, N. F.
Expectorant, Stokes'.....	Mistura Pectoralis, Stokes, N. F.
<i>Expressed Oil of Almond</i>	Oleum Amygdalæ Expressum, U. S. P.
<i>Exsiccated Alum</i>	Alumen Exsiccatum, U. S. P.
<i>Exsiccated Calcium Sulphate</i>	Calcii Sulphas, Exsiccatus, U. S. P. VIII.
<i>Exsiccated Ferrous Sulphate</i>	Ferri Sulphas Exsiccatus, U. S. P.
<i>Exsiccated Sodium Arsenate</i>	Sodii Arsenas Exsiccatus, U. S. P.
<i>Exsiccated Sodium Phosphate</i>	Sodii Phosphas Exsiccatus, U. S. P.
<i>Exsiccated Sodium Sulphite</i>	Sodii Sulphis Exsiccatus, U. S. P.
<i>Extracts</i>	Extracta, U. S. P. and N. F.
<i>Extract of Aconite</i>	Extractum Aconiti, U. S. P.
<i>Extract of Aloe</i>	Extractum Aloes, N. F.
<i>Extract of Arnica Root</i>	Extractum Arnicæ Radicis, N. F. III.
<i>Extract of Beef</i>	Extractum Carnis, N. F.
<i>Extract of Belladonna Leaves</i>	Extractum Belladonnæ Foliorum, U. S. P.
<i>Extract of Blue Flag</i>	Extractum Iridis, N. F. III.
<i>Extract of Butternut</i>	Extractum Juglandis, N. F. III.
<i>Extract of Cannabis</i>	Extractum Cannabis, U. S. P.
<i>Extract of Cantharides, Cerate of</i>	Ceratum Extracti Cantharidis, N. F. III.
<i>Extract of Cascara Sagrada</i>	Extractum Cascaræ Sagradæ, U. S. P.
<i>Extract of Cimicifuga</i>	Extractum Cimicifugæ, U. S. P.
<i>Extract of Cinchona</i>	Extractum Cinchonæ, N. F.
<i>Extract of Colchicum Corm</i>	Extractum Colchici Cormi, U. S. P.
<i>Extract of Colocynth</i>	Extractum Colocynthis, U. S. P.
<i>Extract of Colocynth, Compound</i>	Extractum Colocynthis Compositum, U. S. P.
<i>Extract of Conium</i>	Extractum Conii, N. F.
<i>Extract of Digitalis</i>	Extractum Digitalis, U. S. P. VIII.
<i>Extract of Ergot</i>	Extractum Ergotæ, U. S. P.
<i>Extract of Euonymus</i>	Extractum Euonymi, N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Extract of Gelsemium</i>	Extractum Gelsemii, U. S. P.
<i>Extract of Gentian</i>	Extractum Gentianæ, U. S. P.
<i>Extract of Glycyrrhiza</i>	Extractum Glycyrrhizæ, U. S. P.
<i>Extract of Glycyrrhiza, Pure</i>	Extractum Glycyrrhizæ Purum, U. S. P.
<i>Extract of Glycyrrhiza, Purified</i>	Extractum Glycyrrhizæ Depuratum, N. F.

III.

<i>Extract of Glycyrrhiza, Solution of</i>	Liquor Extracti Glycyrrhizæ, N. F. III.
<i>Extract of Golden Seal</i>	Extractum Hydrastis, U. S. P.
<i>Extract of Hematoxylon</i>	Extractum Hæmatoxyli, N. F.
<i>Extract of Hydrastis</i>	Extractum Hydrastis, U. S. P.
<i>Extract of Hyoscyamus</i>	Extractum Hyoscyami, U. S. P.
<i>Extract of Ignatia</i>	Extractum Ignatiæ, N. F.
<i>Extract of Indian Cannabis</i>	Extractum Cannabis Indicæ, U. S. P. VIII.
<i>Extract of Iris</i>	Extractum Iridis, N. F. III.
<i>Extract of Jalap</i>	Extractum Jalapæ, N. F.
<i>Extract of Juglans</i>	Extractum Juglandis, N. F. III.
<i>Extract of Krameria</i>	Extractum Kramerizæ, N. F.
<i>Extract of Leptandra</i>	Extractum Leptandrzæ, N. F.
<i>Extract of Licorice</i>	Extractum Glycyrrhizæ, U. S. P.
<i>Extract of Malt</i>	Extractum Malti, U. S. P.
<i>Extract of Mayapple</i>	Extractum Podophylli, N. F.
<i>Extract of Nux Vomica</i>	Extractum Nucis Vomizæ, U. S. P.
<i>Extract of Opium</i>	Extractum Opii, U. S. P.
<i>Extract of Ozgall</i>	Extractum Fellis Bovis, U. S. P.
<i>Extract of Physostigma</i>	Extractum Physostigmatizæ, U. S. P.
<i>Extract of Podophyllum</i>	Extractum Podophylli, N. F.
<i>Extract of Quassia</i>	Extractum Quassizæ, N. F.
<i>Extract of Rhubarb</i>	Extractum Rhei, U. S. P.
<i>Extract of Scopola</i>	Extractum Scopolæ, U. S. P. VIII.
<i>Extract of Stramonium</i>	Extractum Stramonii, U. S. P.
<i>Extract of Stramonium Seed</i>	Extractum Stramonii Seminiz, N. F. III.
<i>Extract of Sumbul</i>	Extractum Sumbul, U. S. P.
<i>Extract of Taraxacum</i>	Extractum Taraxaci, U. S. P.
<i>Extract of Uva Ursi</i>	Extractum Uvæ Ursi, N. F. III.
<i>Extract of Vanilla</i>	Tinctura Vanillæ, N. F.
<i>Extract of Viburnum Prunifolium</i>	Extractum Viburni Prunifolii, U. S. P.
<i>Extract of Witch Hazel</i>	Aqua Hamamelidis, U. S. P.
<i>Extractum Belladonnæ</i>	Extractum Belladonnæ Foliorum, U. S. P.
<i>Extractum Chinæ Fluidum</i>	Fluidextractum Cinchonæ, U. S. P.
<i>Extractum Cubebæ</i>	Oleoresina Cubebæ, U. S. P.
<i>Extractum Cusso Fluidum</i>	Fluidextractum Cusso, N. F. III.
<i>Extractum Filicis</i>	Oleoresina Aspidii, U. S. P.
<i>Extractum Hydrastis Fluidum</i>	Fluidextractum Hydrastis, U. S. P.
<i>Extractum Ipecacuanhæ Fluidum</i>	Fluidextractum Ipecacuanhæ, U. S. P.
<i>Extractum Liquiritiæ</i>	Extractum Glycyrrhizæ Purum, U. S. P.
<i>Extractum Liquiritiæ Venale</i>	Extractum Glycyrrhizæ, U. S. P.
<i>Extractum Menispermis Fluidum</i>	Fluidextractum Menispermis, N. F. III.
<i>Extractum Rhamni Purshianæ, U. S. P.</i>	Extractum Cascariæ Sagradæ, U. S. P.

VIII.

<i>Extractum Rhamni Purshianæ Fluidum</i>	Fluidextractum Cascariæ Sagradæ, U. S. P.
<i>Extractum Rhei Fluidum</i>	Fluidextractum Rhei, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Extractum Sarsaparillæ Fluidum	Fluidextractum Sarsaparillæ, U. S. P.
Extractum Secalis Cornuti.....	Extractum Ergotæ, U. S. P.
Extractum Secalis Cornuti Fluidum, P. I.	Fluidextractum Ergotæ, U. S. P.
Extractum Stramonii Seminis Fluidum..	Fluidextractum Stramonii Seminis, N. F.
III.	
Extractum Strychni, P. I.....	Extractum Nucis Vomiceæ, U. S. P.
Extractum Viburni Prunifolii Fluidum..	Fluidextractum Viburni Prunifolii, U. S. P.
False Unicorn.....	Helonias, N. F.
Fel Bovis Purificatum, U. S. P. VIII....	Extractum Fellis Bovis, U. S. P.
Fenner's Guaiac Mixture.....	Tinctura Antacrida, N. F. III.
Fennel.....	Fœniculum, U. S. P.
Fennel Oil.....	Oleum Fœniculi, U. S. P.
Fennel Seed.....	Fœpiculum, U. S. P.
Fennel Water.....	Aqua Fœniculi, U. S. P.
Fermented Milk.....	Lac Fermentatum, N. F.
Ferrated Elixir of Calisaya, Alkaloidal...	Elixir Cinchonæ Alkaloidorum et Ferri, N. F.
Ferrated Extract of Apples.....	Extractum Ferri Pomatum, N. F.
Ferrated Extract of Apples, Tincture of..	Tinctura Ferri Pomata, N. F.
Ferrated Wine of Wild Cherry.....	Vinum Pruni Virginianæ Ferratum, N. F.
Ferric Acetate, Solution of	Liquor Ferri Acetatis, N. F.
Ferric Ammonium Sulphate.....	Ferri et Ammonii Sulphas, U. S. P. VIII.
Ferric Chloride.....	Ferri Chloridum, U. S. P.
Ferric Chloride, Ethereal Tincture of..	Tinctura Ferri Chloridi Aetherea, N. F.
Ferric Chloride, Solution of.....	Liquor Ferri Chloridi, U. S. P.
Ferric Chloride, Tincture of.....	Tinctura Ferri Chloridi, U. S. P.
Ferric Citrate.....	Ferri Citras, U. S. P. VIII.
Ferric Citrate, Solution of.....	Liquor Ferri Citratis, N. F.
Ferric Citro-Chloride, Tincture of.	Tinctura Ferri Citro-Chloridi, N. F.
Ferric Glycerinophosphate.....	Ferri Glycerophosphas, N. F.
Ferric Glycerophosphate.....	Ferri Glycerophosphas, N. F.
Ferric Hydrate with Magnesia.....	Ferri Hydroxidum cum Magnesii Oxido, U. S. P.
Ferric Hydroxide.....	Magma Ferri Hydroxidi, N. F.
Ferric Hydroxide Magma.....	Magma Ferri Hydroxidi, N. F.
Ferric Hydroxide with Magnesium Oxide..	Ferri Hydroxidum cum Magnesii Oxido, U. S. P.
Ferric Hypophosphite.....	Ferri Hypophosphis, N. F.
Ferric Hypophosphite, Elixir of.....	Elixir Ferri Hypophosphitis, N. F.
Ferric Hypophosphite, Solution of.....	Liquor Ferri Hypophosphitis, N. F.
Ferric Hypophosphite, Syrup of.....	Syrupus Ferri Hypophosphitis, N. F.
Ferric Nitrate, Solution of.....	Liquor Ferri Nitratis, N. F.
Ferric Oxchloride, Solution of.....	Liquor Ferri Oxchloridi, N. F.
Ferric Oxysulphate, Solution of.....	Liquor Ferri Oxysulphatis, N. F.
Ferric Phosphate.....	Ferri Phosphas, U. S. P.
Ferric Phosphate, Effervescent Powder of.	Pulvis Ferri Phosphatis Effervescens, N. F.
III.	
Ferric Phosphate, Elixir of.....	Elixir Ferri Phosphatis, N. F.
Ferric Pyrophosphate.....	Ferri Pyrophosphas, N. F.
Ferric Pyrophosphate, Elixir of.....	Elixir Ferri Pyrophosphas, N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Ferric Salicylate, Solution of.....	Liquor Ferri Salicylatis, N. F.
Ferric Subsulphate, Solution of.....	Liquor Ferri Subsulphatis, U. S. P.
Ferric Sulphate, Solution of.....	Liquor Ferri Tersulphatis, U. S. P.
Ferri Hydroxidum, U. S. P. VIII.....	Magma Ferri Hydroxidi, N. F.
Ferri Iodidi, Sirupus, P. I.....	Syrupus Ferri Iodidi, U. S. P.
Ferri Malas Crudus.....	Extractum Pomatum, N. F.
Ferri Phosphas Solubilis, U. S. P. VIII.....	Ferri Phosphas, U. S. P.
Ferrous Carbonate, Mass of.....	Massa Ferri Carbonatis, U. S. P.
Ferrous Carbonate, Pills of.....	Pilulæ Ferri Carbonatis, U. S. P.
Ferrous Chloride, Syrup of.....	Syrupus Ferri Protochloridi, N. F.
Ferrous Iodide, Pills of.....	Pilulæ Ferri Iodidi, U. S. P.
Ferrous Iodide, Saccharated.....	Ferri Iodidum Saccharatum, N. F. III.
Ferrous Iodide, Solution of.....	Liquor Ferri Iodidi, N. F. III.
Ferrous Iodide, Syrup of.....	Syrupus Ferri Iodidi, U. S. P.
<i>Ferrous Lactate</i>	Ferri Lactas, N. F.
<i>Ferrous Sulphate</i>	Ferri Sulphas, U. S. P.
Ferrous Sulphate, Exsiccated.....	Ferri Sulphas, Exsiccatus, U. S. P.
Ferrous Sulphate, Granulated.....	Ferri Sulphas Granulatus, U. S. P.
Ferruginous Pills.....	Pilulæ Ferri Carbonatis, U. S. P.
Ferrum Carbonicum Saccharatum.....	Ferri Carbonas Saccharatus, U. S. P.
Ferrum Oxydatum Saccharatum.....	Ferri Oxidum Saccharatum, N. F.
Ferrum Redactum.....	Ferrum Reductum, U. S. P.
Ferrum Sesquichloratum.....	Ferri Chloridum, U. S. P.
Ferrum Sulfuricum.....	Ferri Sulphas, U. S. P.
Ferrum Sulfuricum Præcipitatum.....	Ferri Sulphas Granulatus, U. S. P.
Ferrum Sulfuricum Siccum.....	Ferri Sulphas Exsiccatus, U. S. P.
<i>Fig</i>	Ficus, N. F.
Figs, Compound Syrup of.....	Syrupus Ficorum Compositus, N. F.
<i>Firm Zinc Glycerogelatin</i>	Glycerogelatinum Zinci Durum, N. F.
Fish Berry.....	Cocculus Indicus, N. F.
Flaxseed.....	Linum, U. S. P.
Fleming's Tincture of Aconite.....	Tinctura Aconiti Fleming, N. F. III.
Flowering Dogwood Bark.....	Cornus, N. F.
<i>Fluidextracts</i>	Fluidextracta, U. S. P. and N. F.
Fluidextract, Aromatic.....	Fluidextractum Aromaticum, U. S. P.
<i>Fluidextract of Aconite</i>	Fluidextractum Aconiti, U. S. P.
Fluidextract of Adonis.....	Fluidextractum Adonidis, N. F.
<i>Fluidextract of Aletris</i>	Fluidextractum Aletridis, N. F.
<i>Fluidextract of Angelic Root</i>	Fluidextractum Angelicæ Radicis, N. F.
<i>Fluidextract of Apocynum</i>	Fluidextractum Apocyni, U. S. P.
<i>Fluidextract of Aralia</i>	Fluidextractum Araliæ, N. F.
<i>Fluidextract of Arnica Flowers</i>	Fluidextractum Arnicæ, N. F.
<i>Fluidextract of Arnica Root</i>	Fluidextractum Arnicæ Radicis, N. F. III.
<i>Fluidextract of Asclepias</i>	Fluidextractum Asclepiadis, N. F.
<i>Fluidextract of Aspidosperma</i>	Fluidextractum Aspidospermatis, U. S. P.
<i>Fluidextract of Baptisia</i>	Fluidextractum Baptisiz, N. F.
<i>Fluidextract of Belladonna Root</i>	Fluidextractum Belladonnæ Radicis, U. S. P.
<i>Fluidextract of Berberis</i>	Fluidextractum Berberidis, N. F.
<i>Fluidextract of Bitter Orange Peel</i>	Fluidextractum Aurantii Amari, U. S. P.
<i>Fluidextract of Bittersweet</i>	Fluidextractum Dulcamaræ, N. F.
<i>Fluidextract of Black Cohosh</i>	Fluidextractum Cimicifugæ, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Fluidextract of Black Haw.....	Fluidextractum Viburni Prunifolii, U. S. P.
Fluidextract of Black Snake Root.....	Fluidextractum Cimicifugæ, U. S. P.
Fluidextract of Boldo.....	Fluidextractum Boldi, N. F.
Fluidextract of Buchu.....	Fluidextractum Buchu, U. S. P.
Fluidextract of Buckthorn Bark.....	Fluidextractum Frangulæ, U. S. P.
Fluid extract of Buckthorn Berries.....	Fluid extractum Rhamni Catharticæ, N. F.
Fluidextract of Calamus.....	Fluidextractum Calami, U. S. P. VIII.
Fluidextract of Calendula.....	Fluidextractum Calendulæ, N. F.
Fluidextract of Calisaya Bark.....	Fluidextractum Cinchonæ, U. S. P.
Fluidextract of Calumba.....	Fluidextractum Calumbæ, N. F.
Fluidextract of Camellia.....	Fluidextractum Camellie, N. F. III.
Fluidextract of Canadian Hemp.....	Fluidextractum Apocyni, U. S. P.
Fluidextract of Cannabis.....	Fluidextractum Cannabis, U. S. P.
Fluidextract of Capsicum.....	Fluidextractum Capsici, U. S. P. VIII.
Fluidextract of Cascara Sagrada.....	Fluidextractum Cascaræ Sagradæ, U. S. P.
Fluidextract of Catarina.....	Fluidextractum Catarizæ, N. F.
Fluidextract of Catnep.....	Fluidextractum Catarizæ, N. F.
Fluidextract of Caulophyllum.....	Fluidextractum Caulophylli, N. F.
Fluidextract of Celery Fruit.....	Fluidextractum Apii Fructus, N. F.
Fluidextract of Chestnut Leaves.....	Fluidextractum Castanee, N. F.
Fluidextract of Chimaphila.....	Fluidextractum Chimaphilæ, N. F.
Fluidextract of Chionanthus.....	Fluidextractum Chionanthi, N. F.
Fluidextract of Chirata.....	Fluidextractum Chiratzæ, N. F.
Fluidextract of Cimicifuga.....	Fluidextractum Cimicifugæ, U. S. P.
Fluidextract of Cinchona.....	Fluidextractum Cinchonæ, U. S. P.
Fluidextract of Coca.....	Fluidextractum Cocæ, U. S. P. VIII.
Fluidextract of Cocillana.....	Fluidextractum Cocillanæ, N. F.
Fluidextract of Coffee.....	Fluidextractum Coffeæ, N. F.
Fluidextract of Colchicum Corn.....	Fluidextractum Colchici Cormi, N. F.
Fluidextract of Colchicum Seed.....	Fluidextractum Colchici Seminis, U. S. P.
Fluidextract of Condurango.....	Fluidextractum Condurango, N. F.
Fluidextract of Conium.....	Fluidextractum Conii, N. F.
Fluidextract of Convallaria Flowers.....	Fluidextractum Convallariæ Florum, N. F.
Fluidextract of Convallaria Root.....	Fluidextractum Convallariæ, Radicis, N. F.
Fluidextract of Coptis.....	Fluidextractum Coptis, N. F.
Fluidextract of Cornus.....	Fluidextractum Corni, N. F.
Fluidextract of Cornus Circinata.....	Fluidextractum Cornus Circinatæ, N. F. III.
Fluidextract of Corydalis.....	Fluidextractum Corydalis, N. F.
Fluidextract of Coto.....	Fluidextractum Coto, N. F. III.
Fluidextract of Cotton Root Bark.....	Fluidextractum Gossypii Corticis, N. F.
Fluidextract of Couch Grass.....	Fluidextractum Triticii, U. S. P.
Fluidextract of Cubeb.....	Fluidextractum Cubebæ, N. F.
Fluidextract of Cypripedium.....	Fluidextractum Cypripedii, N. F.
Fluidextract of Damiana.....	Fluidextractum Damianæ, N. F.
Fluidextract of Dandelion.....	Fluidextractum Taraxaci, U. S. P.
Fluidextract of Digitalis.....	Fluidextractum Digitalis, U. S. P.
Fluidextract of Dioscorea.....	Fluidextractum Dioscoreæ, N. F.
Fluidextract of Drosera.....	Fluidextractum Droseræ, N. F.
Fluidextract of Echinacea.....	Fluidextractum Echinacæ, N. F.
Fluidextract of Ergot.....	Fluidextractum Ergotæ, U. S. P.
Fluidextract of Eriodictyon.....	Fluidextractum Eriodictyi, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Fluidextract of Eucalyptus</i>	<i>Fluidextractum Eucalypti</i> , U. S. P.
<i>Fluidextract of Euonymus</i>	<i>Fluidextractum Euonymi</i> , N. F.
<i>Fluidextract of Eupatorium</i>	<i>Fluidextractum Eupatorii</i> , N. F.
<i>Fluidextract of Euphorbia Pilulifera</i>	<i>Fluidextractum Euphorbiæ Piluliferæ</i> , N. F.
<i>Fluidextract of Frangula</i>	<i>Fluidextractum Frangulæ</i> , U. S. P.
<i>Fluidextract of Fucus</i>	<i>Fluidextractum Fuci</i> , N. F.
<i>Fluidextract of Galega</i>	<i>Fluidextractum Galegæ</i> , N. F.
<i>Fluidextract of Gelsemium</i>	<i>Fluidextractum Gelsemii</i> , U. S. P.
<i>Fluidextract of Gentian</i>	<i>Fluidextractum Gentianæ</i> , U. S. P.
<i>Fluidextract of Geranium</i>	<i>Fluidextractum Geranii</i> , N. F.
<i>Fluidextract of Ginger</i>	<i>Fluidextractum Zingiberis</i> , U. S. P.
<i>Fluidextract of Glycyrrhiza</i>	<i>Fluidextractum Glycyrrhizæ</i> , U. S. P.
<i>Fluidextract of Golden Seal</i>	<i>Fluidextractum Hydrastis</i> , U. S. P.
<i>Fluidextract of Green Coffee</i>	<i>Fluidextractum Coffeæ Viridis</i> , N. F. III.
<i>Fluidextract of Green Hellebore</i>	<i>Fluidextractum Veratri Viridis</i> , U. S. P.
<i>Fluidextract of Grindelia</i>	<i>Fluidextractum Grindeliæ</i> , U. S. P.
<i>Fluidextract of Guarana</i>	<i>Fluidextractum Guaranæ</i> , U. S. P.
<i>Fluidextract of Hamamelis Leaves</i>	<i>Fluidextractum Hamamelidis Foliorum</i> , N. F.
<i>Fluidextract of Helianthemum</i>	<i>Fluidextractum Helianthemii</i> , N. F.
<i>Fluidextract of Helonias</i>	<i>Fluidextractum Helionatis</i> , N. F.
<i>Fluidextract of Henbane</i>	<i>Fluidextractum Hyoscyami</i> , U. S. P.
<i>Fluidextract of Hop</i>	<i>Fluidextractum Humuli</i> , N. F.
<i>Fluidextract of Horse Nettle Berries</i>	<i>Fluidextractum Solani</i> , N. F.
<i>Fluidextract of Hydrangea</i>	<i>Fluidextractum Hydrangææ</i> , N. F.
<i>Fluidextract of Hydrastis</i>	<i>Fluidextractum Hydrastis</i> , U. S. P.
<i>Fluidextract of Hyoscyamus</i>	<i>Fluidextractum Hyoscyami</i> , U. S. P.
<i>Fluidextract of Ipecac</i>	<i>Fluidextractum Ipecacuanhæ</i> , U. S. P.
<i>Fluidextract of Iris Versicolor</i>	<i>Fluidextractum Iridis Versicolor</i> , N. F.
<i>Fluidextract of Jaborandi</i>	<i>Fluidextractum Pilocarpus</i> , U. S. P.
<i>Fluidextract of Jalap</i>	<i>Fluidextractum Jalapæ</i> , N. F.
<i>Fluidextract of Juglans</i>	<i>Fluidextractum Juglandis</i> , N. F.
<i>Fluidextract of Juniper Berries</i>	<i>Fluidextractum Juniperi</i> , N. F.
<i>Fluidextract of Kava</i>	<i>Fluidextractum Kavæ</i> , N. F.
<i>Fluidextract of Kola</i>	<i>Fluidextractum Kolæ</i> , N. F.
<i>Fluidextract of Kousoo</i>	<i>Fluidextractum Cusso</i> , N. F. III.
<i>Fluidextract of Krameria</i>	<i>Fluidextractum Krameriæ</i> , N. F.
<i>Fluidextract of Lappa</i>	<i>Fluidextractum Lappæ</i> , N. F.
<i>Fluidextract of Leptandra</i>	<i>Fluidextractum Leptandræ</i> , N. F.
<i>Fluidextract of Licorice</i>	<i>Fluidextractum Glycyrrhizæ</i> , U. S. P.
<i>Fluidextract of Lobelia</i>	<i>Fluidextractum Lobeliæ</i> , U. S. P.
<i>Fluidextract of Lupulin</i>	<i>Fluidextractum Lupulini</i> , N. F.
<i>Fluidextract of Malt</i>	<i>Fluidextractum Malti</i> , N. F. III.
<i>Fluidextract of Matico</i>	<i>Fluidextractum Matico</i> , N. F.
<i>Fluidextract of Menispermum</i>	<i>Fluidextractum Menispermii</i> , N. F. III.
<i>Fluidextract of Menyanthes</i>	<i>Fluidextractum Menyanthis</i> , N. F. III.
<i>Fluidextract of Mezereum</i>	<i>Fluidextractum Mezerei</i> , N. F.
<i>Fluidextract of Mullein Leaves</i>	<i>Fluidextractum Verbasci Foliz</i> , N. F.
<i>Fluidextract of Musk Root</i>	<i>Fluidextractum Sumbul</i> , U. S. P.
<i>Fluidextract of Nux Vomica</i>	<i>Fluidextractum Nucis Vomizæ</i> , U. S. P.
<i>Fluidextract of Paracoto</i>	<i>Fluidextractum Paracoto</i> , N. F.
<i>Fluidextract of Pareira</i>	<i>Fluidextractum Pareiræ</i> , N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Fluidextract of Parsley Root</i>	<i>Fluidextractum Petroselinæ Radicis</i> , N. F.
<i>Fluidextract of Phytolacca</i>	<i>Fluidextractum Phytolacæ</i> , N. F.
<i>Fluidextract of Pilocarpus</i>	<i>Fluidextractum Pilocarpus</i> , U. S. P.
<i>Fluidextract of Pink Root</i>	<i>Fluidextractum Spigeliæ</i> , U. S. P.
<i>Fluidextract of Podophyllum</i>	<i>Fluidextractum Podophylli</i> , U. S. P.
<i>Fluidextract of Pomegranate</i>	<i>Fluidextractum Granati</i> , U. S. P.
<i>Fluidextract of Prickly Ash</i>	<i>Fluidextractum Xanthoxyli</i> , U. S. P.
<i>Fluidextract of Rhamnus Cathartica</i>	<i>Fluidextractum Rhamni Catharticæ</i> , N. F.
<i>Fluidextractum of Quassia</i>	<i>Fluidextractum Quassiæ</i> , N. F.
<i>Fluidextract of Quebracho</i>	<i>Fluidextractum Aspidospermatis</i> , U. S. P.
<i>Fluidextract of Quercus</i>	<i>Fluidextractum Quercus</i> , N. F.
<i>Fluidextract of Quillaja</i>	<i>Fluidextractum Quillajæ</i> , U. S. P. VIII.
<i>Fluidextract of Rhamnus Catharticus</i>	<i>Fluidextractum Rhamni Catharticæ</i> , N. F.
<i>Fluidextract of Rhamnus Purshiana</i>	<i>Fluidextractum Cascaræ Sagradæ</i> , U. S. P.
<i>Fluidextract of Rhubarb</i>	<i>Fluidextractum Rhei</i> , U. S. P.
<i>Fluidextract of Rhus Glabra</i>	<i>Fluidextractum Rhois Glabræ</i> , N. F.
<i>Fluidextract of Roasted Coffee</i> , N. F. III.	<i>Fluidextractum Coffeæ</i> , N. F.
<i>Fluidextract of Rose</i>	<i>Fluidextractum Rosæ</i> , U. S. P.
<i>Fluidextract of Rubus</i>	<i>Fluidextractum Rubi</i> , N. F.
<i>Fluidextract of Rumex</i>	<i>Fluidextractum Rumicis</i> , N. F.
<i>Fluidextract of Sabal</i>	<i>Fluidextractum Sabal</i> , U. S. P.
<i>Fluidextractum of Sanguinaria</i>	<i>Fluidextractum Sanguinariæ</i> , N. F.
<i>Fluidextract of Sarsaparilla</i>	<i>Fluidextractum Sarsaparillæ</i> , U. S. P.
<i>Fluidextract of Sarsaparilla, Compound</i>	<i>Fluidextractum Sarsaparillæ Compositum</i> , U. S. P.
<i>Fluidextract of Savin</i>	<i>Fluidextractum Sabinæ</i> , U. S. P. VIII.
<i>Fluidextract of Saw Palmetto</i>	<i>Fluidextractum Sabal</i> , U. S. P.
<i>Fluidextract of Scoparius</i>	<i>Fluidextractum Scoparii</i> , N. F.
<i>Fluidextract of Scopola</i>	<i>Fluidextractum Scopolæ</i> , U. S. P. VIII.
<i>Fluidextract of Scutellaria</i>	<i>Fluidextractum Scutellaris</i> , N. F.
<i>Fluidextract of Senecio</i>	<i>Fluidextractum Senecionis</i> , N. F.
<i>Fluidextract of Senega</i>	<i>Fluidextractum Senegæ</i> , U. S. P.
<i>Fluidextract of Senna</i>	<i>Fluidextractum Sennæ</i> , U. S. P.
<i>Fluidextract of Serpentaria</i>	<i>Fluidextractum Serpentariæ</i> , N. F.
<i>Fluidextract of Seven Barks</i>	<i>Fluidextractum Hydrangæ</i> , N. F.
<i>Fluidextract of Solanum</i>	<i>Fluidextractum Solani</i> , N. F.
<i>Fluidextract of Spigelia</i>	<i>Fluidextractum Spigeliæ</i> , U. S. P.
<i>Fluidextract of Squill</i>	<i>Fluidextractum Scillæ</i> , U. S. P.
<i>Fluidextract of Stavesacre</i>	<i>Fluidextractum Staphisagriæ</i> , U. S. P.
<i>Fluidextract of Staphisagria</i>	<i>Fluidextractum Staphisagriæ</i> , U. S. P.
<i>Fluidextract of Stillingia</i>	<i>Fluidextractum Stillingiæ</i> , U. S. P.
<i>Fluidextract of Stramonium</i>	<i>Fluidextractum Stramonii</i> , N. F.
<i>Fluidextract of Stramonium Seed</i>	<i>Fluidextractum Stramonii Seminis</i> , N. F. III.
<i>Fluidextract of Sumbul</i>	<i>Fluidextractum Sumbul</i> , U. S. P.
<i>Fluidextract of Taraxacum</i>	<i>Fluidextractum Taraxaci</i> , U. S. P.
<i>Fluidextract of Thuja</i>	<i>Fluidextractum Thujs</i> , N. F.
<i>Fluidextract of Thyme</i>	<i>Fluidextractum Thymi</i> , N. F.
<i>Fluidextract of Trifolium</i>	<i>Fluidextractum Trifolii</i> , N. F.
<i>Fluidextract of Trillium</i>	<i>Fluidextractum Trillii</i> , N. F.
<i>Fluidextract of Triticum</i>	<i>Fluidextractum Triticici</i> , U. S. P.
<i>Fluidextract of Urtica</i>	<i>Fluidextractum Urticæ</i> , N. F. III.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Fluidextract of Uva Ursi</i>	Fluidextractum Uvæ Ursi, U. S. P.
<i>Fluidextract of Valerian</i>	Fluidextractum Valerianæ, N. F.
<i>Fluidextract of Veratrum Viride</i>	Fluidextractum Veratri Viridis, U. S. P.
<i>Fluidextract of Verbascum</i>	Fluidextract of Verbasci Folise, N. F.
<i>Fluidextract of Verbena</i>	Fluidextractum Verbenæ, N. F.
<i>Fluidextract of Viburnum Opulus</i>	Fluidextractum Viburni Opuli, N. F.
<i>Fluidextract of Viburnum Prunifolium</i> ...	Fluidextractum Viburni Prunifolii, U. S. P.
<i>Fluidextract of Wild Cherry</i>	Fluidextractum Pruni Virginianæ, N. F.
<i>Fluidextract of Witch Hazel Leaves</i>	Fluidextractum Hamamelidis Foliorum, N. F.
<i>Fluidextract of Xanthoxylum</i>	Fluidextractum Xanthoxyli, U. S. P.
<i>Fluidextract of Yerba Santa</i>	Fluidextractum Eriodictyi, U. S. P.
<i>Fluidextract of Zea</i>	Fluidextractum Zæe, N. F.
<i>Fluidextractum Coffeæ Tostæ</i> , N. F. III.	Fluidextractum Coffeæ, N. F.
<i>Fluidextractum Colchici Radicis</i>	Fluidextractum Colchici Cormi, N. F.
<i>Fluidextractum Convallariæ</i> , N. F. III.	Fluidextractum Convallariæ Florum, N. F.
<i>Fluidextractum Coto</i> , N. F. III.	Fluidextractum Paracoto, N. F.
<i>Fluidextractum Rhamni Purshianæ</i>	<i>Fluidextractum Cascariæ Sagradæ Aromaticum</i> , U. S. P. VIII.
<i>Fluidextractum Sterculiæ</i> , N. F. III.	Fluidextractum Kolæ, N. F.
<i>Fluidextractum Turneriæ</i> , N. F. III.	Fluidextractum Damianæ, N. F.
<i>Fluidglycerates</i>	Fluidglycerata, N. F.
<i>Fluidglycerate of Cascara Sagrada</i>	Fluidglyceratum Cascariæ Sagradæ, N. F.
<i>Fluidglycerate of Cascara Sagrada, Aromatic</i> .	Fluidglyceratum Cascariæ Sagradæ Aromaticum, N. F.
<i>Fluidglycerate of Glycyrrhiza</i>	Fluidglyceratum Glycyrrhizæ, N. F.
<i>Fluidglycerate of Krameria</i>	Fluidglyceratum Kramerizæ, N. F.
<i>Fluidglycerate of Licorice</i>	Fluidglyceratum Glycyrrhizæ, N. F.
<i>Fluidglycerate of Rhamnus Purshiana</i> ...	Fluidglyceratum Cascariæ Sagradæ, N. F.
<i>Fluidglycerate of Rhubarb</i>	Fluidglyceratum Rhei, N. F.
<i>Flores Arnicæ</i>	Arnica, U. S. P.
<i>Flores Chamomillæ</i>	Matricaria, U. S. P.
<i>Flos Chamomillæ</i>	Matricaria, U. S. P.
<i>Flos Cinaæ</i>	Santonica, U. S. P.
<i>Flowering Dogwood Bark</i>	Cornus, N. F.
<i>Flowers of Sulphur</i>	Sulphur Sublimatum, U. S. P.
<i>Folia Menthæ Piperitæ</i>	Mentha Piperita, U. S. P.
<i>Folia Sennæ</i>	Senna, U. S. P.
<i>Folia Uvæ Ursi</i>	Uva Ursi, U. S. P.
<i>Folium Belladonnæ</i> , P. I.	Belladonnæ Folia, U. S. P.
<i>Folium Digitalis</i> , P. I.	Digitalis, U. S. P.
<i>Folium Hyoscyami</i> , P. I.	Hyoscyamus, U. S. P.
<i>Folium Jaborandi</i>	Pilocarpus, U. S. P.
<i>Folium Stramonii</i>	Stramonium, U. S. P.
<i>Forbe's Emulsion of Oil of Turpentine</i> ...	Emulsio Olei Terebinthinæ Fortior, N. F. III.
<i>Formaldehyde, Solution of</i>	Liquor Formaldehydi, U. S. P.
<i>Formaldehydum solutum</i>	Liquor Formaldehydi, U. S. P.
<i>Formalol</i>	Hexamethylenamina, U. S. P.
<i>Formamine, B. P. C.</i>	Hexamethylenamina, U. S. P.
<i>Formates, Compound Elixir of</i>	Elixir Formatum Compositum.
<i>Formates, Elixir of</i>	Elixir Formatum, N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Formic Acid</i>	Acidum Formicum, N. F.
Formic Acid, Spirit of.....	Spiritus Acidi Formici, N. F.
Formin.....	Hexamethylenamina, U. S. P.
Fowler's Solution.....	Liquor Potassii Arsenitis, U. S. P.
Fox Glove.....	Digitalis, U. S. P.
Francis' Triplex Pills.....	Pilulæ Aloes Hydrargyri et Scammonii Compositæ, N. F.
<i>Frangula</i>	Frangula, U. S. P.
Frangula, Elixir of.....	Elixir Frangulæ, N. F. III.
Frangula, Fluidextract of.....	Fluidextractum Frangulæ, U. S. P.
French Mixture.....	Liquor Iodi Phenolatus, N. F.
<i>Fresh Apple Juice</i>	Succus Pomorum, N. F.
Fresh Drugs, Tincture of.....	Tincturæ Medicamentorum Recentium, N. F.
<i>Fresh Egg</i>	Ovum Gallinaceum, N. F.
<i>Fresh Egg Albumen</i>	Ovi Albumen, Recens, N. F.
<i>Fresh Egg Yolk</i>	Ovi Vitellum Recens, N. F.
Friar's Balsam.....	Balsamum Traumaticum, N. F. III.
Fringe Tree Bark.....	Chionanthus, N. F.
Frost-weed.....	Helianthemum, N. F.
Fructus Anisi.....	Anisum, U. S. P.
Fructus Capsici.....	Capsicum, U. S. P.
Fructus Cardamomi.....	Cardamomi Semen, U. S. P.
Fructus Carvi.....	Carum, U. S. P.
Fructus Colocynthis.....	Colocynthis Pulpa, U. S. P.
Fructus Coriandri.....	Coriandrum, U. S. P.
Fructus Cubebæ.....	Cubeba, U. S. P.
Fructus Foeniculi.....	Feniculum, U. S. P.
Fruit, Celery.....	Apii Fructus, N. F.
<i>Fucus</i>	Fucus, N. F.
Fucus, Fluidextract of.....	Fluidextractum Fuci, N. F.
Fused Silver Nitrate.....	Argenti Nitras Fusus, U. S. P.
Gadberry's Mixture.....	Mistura Splenetica, N. F. III.
<i>Galangal</i>	Galangal, N. F.
Galbanum, Compound Pills of.....	Pilulæ Galbani Compositæ, N. F. III.
<i>Galbanum Plaster</i>	Emplastrum Galbani, N. F. III.
<i>Galega</i>	Galega, N. F.
Galega, Fluidextract of.....	Fluidextractum Galegæ, N. F.
Gallæ.....	Galla, U. S. P.
<i>Gallic Acid</i>	Acidum Gallicum, U. S. P.
<i>Gambir</i>	Gambir, U. S. P.
Gambir, Compound Powder of.....	Pulvis Gambir Compositus, N. F. IV.
Gambir, Compound Tincture of.....	Tinctura Gambir Composita, U. S. P.
Gambir, Troches of.....	Trochisci Gambir, N. F.
<i>Gamboge</i>	Cambogia, U. S. P.
Ganjah.....	Cannabis, U. S. P.
<i>Garlic</i>	Allium, N. F.
Garlic, Syrup of.....	Syrupus Allii, N. F.
Gaultheria, Spirit of.....	Spiritus Gaultheriæ, U. S. P. VIII.
<i>Gelatin</i>	Gelatinum, U. S. P.
<i>Gelatina Alba</i>	Gelatinum, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Gelatin, Glycerinated.....	Gelatinum Glycerinatum, U. S. P.
Gelsemium.....	Gelsemium, U. S. P.
Gelsemium, Extract of.....	Extractum Gelsemii, U. S. P.
Gelsemium, Fluidextract of.....	Fluidextractum Gelsemii, U. S. P.
Gelsemium, Tincture of.....	Tinctura Gelsemii, U. S. P.
Gentian.....	Gentiana, U. S. P.
Gentian and Ferric Phosphate, Elixir of.....	Elixir Gentianæ et Ferri Phosphatis, N. F.
Gentian, Compound Tincture of.....	Tinctura Gentianæ Composita, U. S. P.
Gentian, Elixir of.....	Elixir Gentianæ, N. F.
Gentian, Extract of.....	Extractum Gentianæ, U. S. P.
Gentian, Fluidextract of.....	Fluidextractum Gentianæ, U. S. P.
Gentian, Glycerinated Elixir of.....	Elixir Gentianæ Glycerinatum, N. F.
Gentian with Tincture of Ferric Citro- Chloride, Elixir of.....	Elixir Gentianæ et Ferri, N. F.
Gentian, Compound Infusion of.....	Infusum Gentianæ Compositum, N. F.
Gentian, Stronger Compound Infusion of.....	Infusum Gentianæ Compositum, Fortius, N. F. III.
Geranium.....	Geranium, N. F.
Geranium, Fluidextract.....	Fluidextractum Geranii, N. F.
German Chamomile.....	Matricaria, U. S. P.
Germicide.....	Liquor Antigerminalis, N. F. III.
Ginger.....	Zingiber, U. S. P.
Ginger, Fluidextract of.....	Fluidextractum Zingiberis, U. S. P.
Ginger, Oleoresin of.....	Oleoresina Zingiberis, U. S. P.
Ginger, Solution of.....	Liquor Zingiberis, N. F. III.
Ginger, Syrup of.....	Syrupus Zingiberis, U. S. P.
Ginger, Tincture of.....	Tinctura Zingiberis, U. S. P.
Ginger, Troches of.....	Trochisci Zingiberis, N. F. III.
Glacial Acetic Acid.....	Acidum Aceticum Glaciale, U. S. P.
Glandulæ Suprenales Siccae, U. S. P.,	Suprarenalum Siccum, U. S. P.
VIII.	
Glandulæ Thyroideæ Siccae, U. S. P.	Thyroideum Siccum, U. S. P.
VIII.	
Glauber's Salt.....	Sodii Sulphas, U. S. P.
Glucose.....	Glucosum, U. S. P.
Glusidum.....	Benzosulphinidum, U. S. P.
Glycerin.....	Glycerinum, U. S. P.
Glycerinated Elixir of Gentian.....	Elixir Gentianæ Glycerinatum, N. F.
Glycerinated Gelatin.....	Gelatinum Glycerinatum, U. S. P.
Glycerinated Vaccine Virus.....	Virus Vaccinicum, U. S. P.
Glycerin, Suppositories of.....	Suppositoria Glycerini, U. S. P.
Glycerite of Bismuth.....	Glyceritum Bismuthi, N. F.
Glycerite of Boroglycerin.....	Glyceritum Boroglycerini, U. S. P.
Glycerite of Carbolic Acid.....	Glyceritum Phenolis, U. S. P.
Glycerite of Golden Seal.....	Glyceritum Hydrastis, U. S. P.
Glycerite of Guaiac.....	Glyceritum Guaiaci, N. F.
Glycerite of Hydrastis.....	Glyceritum Hydrastis, U. S. P.
Glycerite of Pepsin.....	Glyceritum Pepsini, N. F.
Glycerite of Phenol.....	Glyceritum Phenolis, U. S. P.
Glycerite of Starch.....	Glyceritum, Amyli, U. S. P.
Glycerite of Tannic Acid.....	Glyceritum Acidi Tannici, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Glycerite of Tannin.....	Glyceritum Acidi Tannici, U. S. P.
Glycerite of Tar.....	Glyceritum Picis Liquidæ, N. F.
Glycerite of the Phosphates of Iron, Quinine, and Strychnine.	Glyceritum Ferri Quininae et Strychninae Phosphatum, U. S. P. VIII.
Glycerite of Tragacanth.....	Glyceritum Tragacanthæ, N. F.
Glycerite of Yolk of Egg.....	Glyceritum Vitelli, N. F.
Glycerogelatin.....	Glycerogelatina, N. F.
Glycerol.....	Glycerinum, U. S. P.
Glycerophosphates, Compound Elixir of..	Elixir Glycerophosphatum Compositum, N. F.
Glycerophosphates, Elixir of.....	Elixir Glycerophosphatum, N. F. III.
Glyceryl Borate.....	Boroglycerinum, N. F. III.
Glyceryl Trinitrate, Spirit of.....	Spiritus Glycerylis Nitratis, U. S. P.
Glyconin Emulsion of Cod Liver Oil,	Emulsum Olei Morrhuae cum Vitello, N. F. N. F. III.
Glycyrrhiza.....	Glycyrrhiza, U. S. P.
Glycyrrhiza and Opium, Troches of.	Trochisci Glycyrrhizæ et Opii, U.S.P. VIII.
Glycyrrhiza, Aqueous Elixir of.....	Elixir Glycyrrhizæ Aqueum, N. F.
Glycyrrhiza, Aromatic Elixir of.	Elixir Glycyrrhizæ Aromaticum.
Glycyrrhiza, Compound Powder of.	Pulvis Glycyrrhizæ Compositus, U. S. P.
Glycyrrhiza, Compound Mixture of.....	Mistura Glycyrrhizæ Composita, U. S. P.
Glycyrrhiza, Elixir of.....	Elixir Glycyrrhizæ, N. F. III.
Glycyrrhiza, Extract of.....	Extractum Glycyrrhizæ, U. S. P.
Glycyrrhiza, Fluidextract of.....	Fluidextractum Glycyrrhizæ, U. S. P.
Glycyrrhiza, Fluidglycerate of.....	Fluidglyceratum Glycyrrhizæ, N. F.
Glycyrrhiza, Pure Extract of.....	Extractum Glycyrrhizæ Purum, U. S. P.
Glycyrrhiza, Purified Extract of.....	Extractum Glycyrrhizæ Depuratum, N. F. III.
Glycyrrhiza, Solution of Extract of.....	Liquor Extracti Glycyrrhizæ, N. F. III.
Glycyrrhiza, Syrup of.....	Syrupus Glycyrrhizæ, N. F.
Glycyrrhizin, Ammoniated.....	Glycyrrhizinum Ammoniatum, U. S. P.
Godfrey's Cordial.....	Mistura Sassafras et Opii, N. F.
Gold and Arsenic Bromide, Solution of..	Liquor Auri et Arseni Bromidi, N. F.
Gold and Sodium Chloride.....	Auri et Sodii Chloridum, U. S. P.
Golden Seal.....	Hydrastis, U. S. P.
Goldthread.....	Coptis, N. F.
Goulard's Cerate.....	Ceratum Plumbi Subacetatis, N. F.
Goulard's Extract.....	Liquor Plumbi Subacetatis, U. S. P.
Gossypium Depuratum.....	Gossypium Purificatum, U. S. P.
Granular Effervescent Salts.....	Sales Effervescentes, N. F.
Granulated Ferrous Sulphate.....	Ferri Sulphas Granulatus, U. S. P.
Granulated Opium.....	Opium Granulatum, U. S. P.
Gray Powder.....	Hydrargyrum cum Creta, U. S. P.
Green Coffee, Fluidextract of.....	Fluidextractum Coffea Viridis, N. F. III.
Green Hellebore.....	Veratrum Viride, U. S. P.
Green Soap, Compound Tincture of.....	Tinctura Saponis Viridis, Composita, N. F. III.
Gregory's Powder.....	Pulvis Rhei Compositus, U. S. P.
Griffith's Mixture.....	Mistura Ferri Composita, N. F.
Grindelia.....	Grindelia, U. S. P.
Grindelia, Elixir of.....	Elixir Grindeliæ, N. F. III.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Grindelia, Fluidextract of.....	Fluidextractum Grindeliæ, U. S. P.
Gross' Antineuralgic Pill.....	Pilulæ Antineuralgicæ, N. F. III.
Guaiac.....	Guaiacum, U. S. P.
Guaiac, Ammoniated Tincture of.....	Tinctura Guaiaci Ammoniata, U. S. P.
Guaiac, Compound Gargle of.....	Gargarisma Guaiaci Composita, N. F.
Guaiac, Compound Tincture of.....	Tinctura Guaiaci Composita, N. F.
Guaiac, Glycerite of.....	Glyceritum Guaiaci, N. F.
Guaiac, Mixture of.....	Mistura Guaiaci, N. F.
Guaiacol.....	Guaiacol, U. S. P.
Guaiacol Carbonate.....	Guaiacolis Carbonas, U. S. P.
Guaiacol Petrox.....	Petroxolinum Guaiacolis, N. F.
Guaiacol Petrozolin.....	Petroxolinum Guaiacolis, N. F.
Guaiac Resin.....	Guaiacum, U. S. P.
Guaiac, Tincture of.....	Tinctura Guaiaci, U. S. P.
Guaiac Wood.....	Guaiaci Lignum, N. F.
Guajacolum.....	Guaiacol, U. S. P.
Guajacolum Carbonicum.....	Guaiacolis Carbonas, U. S. P.
Guarana.....	Guarana, U. S. P.
Guarana, Elixir of.....	Elixir Guaranæ, N. F.
Guarana, Fluidextract of.....	Fluidextractum Guaranæ, U. S. P.
Guaza.....	Cannabis, U. S. P.
Gum Arabic.....	Acacia, U. S. P.
Gum Asafetida.....	Asafetida, U. S. P.
Gum Benjamin.....	Benzoinum, U. S. P.
Gum Guaiac.....	Guaiacum, U. S. P.
Gummi Arabicum.....	Acacia, U. S. P.
Gummiresina Myrrha.....	Myrrha, U. S. P.
Gum Myrrh.....	Myrrha, U. S. P.
Gum Senegal.....	Acacia, U. S. P.
Gum Tragacanth.....	Tragacantha, U. S. P.
Guttæ Pectorales.....	Tinctura Pectoralis, N. F.
Gutta Percha.....	Gutta Percha, N. F.
Gutta Percha, Solution of.....	Liquor Guttæ Perchæ, N. F.
Guy's Pills.....	Pilulæ Digitalis Scillæ et Hydrargyri, N. F.
Haller's Acid Elixir.....	Mistura Sulphurica Acida, N. F. III.
Hall's Dinner Pill.....	Pilulæ Ad Prandium, N. F.
Hall's Solution of Strychnine.....	Liquor Strychninæ Acetatis, N. F.
Hamamelis Bark.....	Hamamelidis Cortex, U. S. P. VIII.
Hamamelis Leaves.....	Hamamelidis Folia, N. F.
Hamamelis Leaves, Fluidextract of.....	Fluidextractum Hamamelidis Foliorum, N. F.
Hamamelis Water.....	Aqua Hamamelidis, U. S. P.
Hartshorn Liniment.....	Linimentum Ammoniacæ, U. S. P.
Heavy Liquid Petrolatum.....	Petrolatum Liquidum, U. S. P.
Heavy Magnesia.....	Magnesiæ Oxidum Ponderosum, U. S. P.
Heavy Magnesium Oxide.....	Magnesiæ Oxidum Ponderosum, U. S. P.
Hebra's Itch Ointment.....	Unguentum Sulphuris Compositum, N. F.
Hedeoma.....	Hedeoma, U. S. P. VIII.
Hedeoma, Oil of.....	Oleum Hedeomæ, U. S. P. VIII.
Helianthemum.....	Helianthemum, N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Helianthemum, Fluidextract of.....	Fluidextractum Helianthemi, N. F.
<i>Helonias</i>	Helonias, N. F.
Helonias, Fluidextract of.....	Fluidextractum Heloniatis, N. F.
<i>Hematoxylon</i>	Hæmatoxylon, N. F.
Hematoxylon, Extract of.....	Extractum Hæmatoxyli, N. F.
Henbane.....	Hyoscyamus, U. S. P.
Hen's Egg.....	Ovum Gallinaceum, N. F.
Herba Cannabis Indicæ.....	Cannabis, U. S. P.
Herba Lobeliae.....	Lobelia, U. S. P.
Heroinum.....	Diacetylmorphina, U. S. P.
Heroinum Hydrochloridum.....	Diacetylmorphinæ Hydrochloridum, U. S. P.
<i>Hexamethylenamine</i>	Hexamethylenamina, U. S. P.
Hexamethylene-tetramine.....	Hexamethylenamina, U. S. P.
Hexamine, Ph. Brit.....	Hexamethylenamine, U. S. P.
High Cranberry Bark.....	Viburnum Opulus N. F.
Hive Syrup.....	Syrupus Scillæ Compositus, U. S. P.
Hoffmann's Anodyne.....	Spiritus Ætheris Compositus, N. F.
Hoffmann's Drops.....	Spiritus Ætheris, U. S. P.
Homatropine Bromide.....	Homatropinæ Hydrobromidum, U. S. P.
<i>Homatropine Hydrobromide</i>	Homatropinæ Hydrobromidum, U. S. P.
Homatropinum Hydrobromicum.....	Homatropinæ Hydrobromidum, U. S. P.
<i>Honey</i>	Mel, U. S. P.
Honey and Borax.....	Mel Sodii Boratis, N. F.
Honey, Clarified.....	Mel Depuratum, U. S. P.
Honey of Rose.....	Mel Rosæ, U. S. P.
Honey of Rose with Borax.....	Mel Rosæ cum Sodii Boratis, N. F.
<i>Honey of Rose with Sodium Borate</i>	Mel Rosæ cum Sodii Boratis, N. F.
<i>Honey of Sodium Borate</i>	Mel Sodii Boratis, N. F.
Hope's Mixture.....	Mistura Camphoræ Acida, N. F.
<i>Hops</i>	Humulus, U. S. P.
Hops, Elixir of.....	Elixir Humuli, N. F.
Hops, Fluidextract of.....	Fluidextractum Humuli, N. F.
Hops, Tincture of.....	Tinctura Humuli, N. F.
Horse-nettle Berries.....	Solanum, N. F.
Hot Drops.....	Tinctura Capsici et Myrrhæ, N. F.
<i>Humanized milk</i>	Lac Humanisatum, N. F. III.
<i>Humanizing Milk Powder</i>	Pulvis Pro Lacte Humanisato, N. F. III.
Huxham's Tincture.....	Tinctura Cinchonæ Composita, U. S. P.
<i>Hydrangea</i>	Hydrangea, N. F.
Hydrangea, Fluidextract of.....	Fluidextractum Hydrangæ, N. F.
Hydrargyri Unguentum P. I.....	Unguentum Hydrargyri Dilutum, U. S. P.
Hydrargyrum Bichloratum.....	Hydrargyri Chloridum Corrosivum.
Hydrargyrum Bijodatum.....	Hydrargyri Iodidum Rubrum, U. S. P.
Hydrargyrum Iodatum Flavum.....	Hydrargyri Iodidum Flavum, U. S. P.
Hydrargyrum Chloratum.....	Hydrargyri Chloridum Mite, U. S. P.
Hydrargyrum Oxydatum Flavum.....	Hydrargyri Oxidum Flavum, U. S. P.
Hydrargyrum Oxydatum Rubrum.....	Hydrargyri Oxidum Rubrum, U. S. P.
Hydrargyrum Precipitatum Album.....	Hydrargyrum Ammoniatum, U. S. P.
Hydras Chloralicus.....	Chloralum Hydratum, U. S. P.
Hydras Kalicus.....	Potassii Hydroxidum, U. S. P.
Hydras Natrius.....	Sodii Hydroxidum, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Hydras Terpicus.....	Terpini Hydras, U. S. P.
<i>Hydrastine</i>	Hydrastina, U. S. P.
Hydrastine Chloride.....	Hydrastinæ Hydrochloridum, U. S. P.
<i>Hydrastine Hydrochloride</i>	Hydrastinæ Hydrochloridum, U. S. P.
Hydrastine, Compound Solution of.....	Liquor Hydrastinæ Compositus, N. F.
Hydrastinine Chloride.....	Hydrastininæ Hydrochloridum, U. S. P.
<i>Hydrastinine Hydrochloride</i>	Hydrastininæ Hydrochloridum, U. S. P.
Hydrastininum Hydrochloricum.....	Hydrastininæ Hydrochloridum, U. S. P.
<i>Hydrastis</i>	Hydrastis, U. S. P.
Hydrastis, Extract of.....	Extractum Hydrastis, U. S. P.
Hydrastis, Fluidextract of.....	Fluidextractum Hydrastis, U. S. P.
Hydrastis, Glycerite of.....	Glyceritum Hydrastis, U. S. P.
Hydrastis, Tincture of.....	Tinctura Hydrastis, U. S. P.
<i>Hydrated Chloral</i>	Chloralum Hydratum, U. S. P.
<i>Hydrated Oxide of Bismuth</i>	Bismuthi Oxidum Hydratum, N. F. III.
Hydratocarbonas Magnesicus.....	Magnesiæ Carbonas, U. S. P.
Hydriodic Acid, Diluted.....	Acidum Hydriodicum Dilutum, U. S. P.
Hydriodic Acid, Syrup of.....	Syrupus Acidi Hydriodici, U. S. P.
Hydrobromic Acid, Diluted.....	Acidum Hydrobromicum Dilutum, U. S. P.
<i>Hydrochloric Acid</i>	Acidum Hydrochloricum, U. S. P.
Hydrochloric Acid, Diluted.....	Acidum Hydrochloricum Dilutum, U. S. P.
Hydrochloric Solution of Arsenic.....	Liquor Acidi Arsenosi, U. S. P.
Hydrocyanic Acid, Diluted.....	Acidum Hydrocyanicum Dilutum, U. S. P.
Hydrogen Dioxide, Solution of.....	Liquor Hydrogenii Dioxidi, U. S. P.
Hydrogenium Hyperoxydatum Solutum.....	Liquor Hydrogenii Dioxidi, U. S. P.
<i>Hydrous Wool-Fat</i>	Adeps Lanæ Hydrosus, U. S. P.
Hydroxide, Aluminum.....	Alumini Hydroxidum, U. S. P.
Hyoscine Hydrobromide.....	Scopolaminæ Hydrobromidum, U. S. P.
Hyoscyami Extractum P. I.....	Extractum Hyoscyami, U. S. P.
Hyoscyamine Bromide.....	Hyoscyaminæ Hydrobromidum, U. S. P.
<i>Hyoscyamine Hydrobromide</i>	Hyoscyaminæ Hydrobromidum, U. S. P.
Hyoscyamine Sulphate.....	Hyoscyaminæ Sulphas, U. S. P. VIII.
Hyoscyami Tinctura P. I.....	Tinctura Hyoscyami, U. S. P.
<i>Hyoscyamus</i>	Hyoscyamus, U. S. P.
Hyoscyamus, Compound Oil of.....	Oleum Hyoscyami Compositum, N. F.
Hyoscyamus, Extract of.....	Extractum Hyoscyami, U. S. P.
Hyoscyamus, Fluidextract of.....	Fluidextractum Hyoscyami, U. S. P.
Hyoscyamus, Tincture of.....	Tinctura Hyoscyami, U. S. P.
Hypermanganas Kalicus.....	Potassii Permanganas, U. S. P.
<i>Hypodermic Solution of Morphine</i>	Liquor Morphinæ Hyperdermicus, N. F. III.
Hypophosphis Calcicus.....	Calcii Hypophosphis, U. S. P.
Hypophosphis Kalicus.....	Potassii Hypophosphis, U. S. P.
<i>Hypophosphite of Iron</i>	Ferri Hypophosphis, N. F. III.
Hypophosphites, Compound Solution of.....	Liquor Hypophosphitum Compositus, N. F.
Hypophosphites, Compound Syrup of.....	Syrupus Hypophosphitum Compositus N. F.
Hypophosphites, Elixir of.....	Elixir Hypophosphitum, N. F.
Hypophosphites, Solution of.....	Liquor Hypophosphitum, N. F.
Hypophosphites, Syrup of.....	Syrupus Hypophosphitum, U. S. P.
Hypophosphites with Iron, Elixir of.....	Elixir Hypophosphitum et Ferri, N. F.
<i>Hypophosphorous Acid</i>	Acidum Hypophosphorosum, N. F. III.
Hypophosphorous Acid, Diluted.....	Acidum Hypophosphorosum Dilutum, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Hypophysis, Desiccated.....	Hypophysis Sicca, U. S. P.
Hypophysis, Solution of.....	Liquor Hypophysis, U. S. P.
Ichthyol Paste, Unna.....	Pasta Ichthyoli, Unna, N. F. III.
<i>Ignatia</i>	<i>Ignatia</i> , N. F.
<i>Ignatia Amara</i>	<i>Ignatia</i> , N. F.
<i>Ignatia</i> , Extract of.....	<i>Extractum Ignatiæ</i> , N. F.
<i>Ignatia</i> , Tincture of.....	<i>Tinctura Ignatiæ</i> , N. F.
Indian Berry.....	<i>Cocculus Indicus</i> , N. F.
Indian Pink.....	<i>Spigelia</i> , U. S. P.
Indian Tobacco.....	<i>Lobelia</i> , U. S. P.
Indigo Carmine.....	<i>Sodii Indigotindisulphonas</i> , U. S. P.
<i>Infused Oils</i>	<i>Olea Infusa</i> , N. F.
<i>Infusions</i>	<i>Infusa</i> , U. S. P.
<i>Infusion of Brayera</i>	<i>Infusum Brayeræ</i> , N. F.
<i>Infusion of Cinchona</i>	<i>Infusum Cinchonæ</i> , N. F.
<i>Infusion of digitalis</i>	<i>Infusum Digitalis</i> , U. S. P.
Infusion of Gentian, Compound.....	<i>Infusum Gentianæ Compositum</i> , N. F.
Infusion of Gentian, Stronger Com- pound.....	<i>Infusum Gentianæ Compositum Fortius</i> , N. F. III.
Infusion of Rose, Compound.....	<i>Infusum Rosæ Compositum</i> , N. F. III.
Infusion of senna, Compound.....	<i>Infusum Sennæ Compositum</i> , U. S. P.
<i>Infusion of Wild Cherry</i>	<i>Infusum Pruni Virginianæ</i> , N. F.
Infusorial Earth, Purified.....	<i>Terra Silicea Purificata</i> , U. S. P.
<i>Inula</i>	<i>Inula</i> , N. F.
Inunction. (See under Menthol.)	
<i>Iodine</i>	<i>Iodum</i> , U. S. P.
Iodine Caustic.....	Liquor Iodi Causticus, N. F. III.
Iodine, Compound Solution of.....	Liquor Iodi Compositus, U. S. P.
Iodine, Decolorized Tincture of.....	<i>Tinctura Iodi Decolorata</i> , N. F.
<i>Iodine Liniment</i>	<i>Linimentum Iodi</i> , N. F. III.
<i>Iodine Ointment</i>	<i>Unguentum Iodi</i> , U. S. P.
Iodine Petrox, 5 per cent.....	<i>Petroxolinum Iodi Dilutum</i> , N. F.
Iodine Petrox, 10 per cent.....	<i>Petroxolinum Iodi</i> , N. F.
<i>Iodine Petroxolin</i>	<i>Petroxolinum Iodi</i> , N. F.
Iodine, Phenolated Solution of.....	Liquor Iodi Phenolatus, N. F.
Iodine, Stronger Tincture of.....	<i>Tinctura Iodi Fortior</i> , N. F.
Iodine, Tincture of.....	<i>Tinctura Iodi</i> , U. S. P.
Iodized Carbolic Acid.....	<i>Phenolum Iodatum</i> , N. F.
<i>Iodized Phenol</i>	<i>Phenolum Iodatum</i> , N. F.
Iodized Starch.....	<i>Amylum Iodatum</i> , N. F. III.
<i>Iodoform</i>	<i>Iodoformum</i> , U. S. P.
Iodoform, Aromatized.....	<i>Iodoformum Aromatisatum</i> , N. F.
<i>Iodoform Collodion</i>	<i>Collodium Iodoformi</i> , N. F.
Iodoform, Compound Powder.....	<i>Pulvis Iodoformi Compositus</i> , N. F. III.
<i>Iodoform Glycerogelatin</i>	<i>Glycerogelatinum Iodoformi</i> , N. F.
Iodoformium.....	<i>Iodoformum</i> , U. S. P.
<i>Iodoform Ointment</i>	<i>Unguentum Iodoformi</i> , U. S. P.
Iodoform Petrox.....	<i>Petroxolinum Iodoformi</i> , N. F.
<i>Iodoform Petroxolin</i>	<i>Petroxolinum Iodoformi</i> , N. F.
<i>Iodol</i>	<i>Iodolum</i> , U. S. P. VIII.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Iodo-tannin, Syrup of.....	Syrupus Iodotannicus, N. F.
Iodum.....	Iodum, U. S. P.
<i>Ipecac</i>	<i>Ipecacuanha</i> , U. S. P.
<i>Ipecac</i> and <i>Opium</i> , Powder of.....	<i>Pulvis Ipecacuanhæ et Opii</i> , U. S. P.
<i>Ipecac</i> and <i>Opium</i> , Tincture of.....	<i>Tinctura Ipecacuanhæ et Opii</i> , N. F.
<i>Ipecac</i> and <i>Opium</i> , Syrup of.....	<i>Syrupus Ipecacuanhæ et Opii</i> , N. F.
<i>Ipecac</i> , Fluidextract of.....	<i>Fluidextractum Ipecacuanhæ</i> , U. S. P.
<i>Ipecac</i> , Syrup of.....	<i>Syrupus Ipecacuanhæ</i> , U. S. P.
<i>Ipecac</i> , Troches of.....	<i>Trochisci Ipecacuanhæ</i> , N. F. III.
<i>Ipecac</i> , Troches of Morphine and.....	<i>Trochisci Morphinæ et Ipecacuanhæ</i> , N. F. III.
<i>Ipecacuanhæ</i>	<i>Radix Ipecacuanhæ</i> , U. S. P.
<i>Ipaec</i> , Wine of.....	<i>Vinum Ipecacuanhæ</i> , N. F.
<i>Iris</i> , Extract of.....	<i>Extractum Iridis</i> , N. F. III.
<i>Iris Versicolor</i> , Fluidextract of.....	<i>Fluidextractum Iris Versicoloris</i> , N. F.
<i>Irish Moss</i>	<i>Chondrus</i> , U. S. P.
<i>Irish Moss Gelatin</i>	<i>Gelatinum Chondri</i> , N. F.
<i>Iron</i>	<i>Ferrum</i> , U. S. P.
<i>Iron</i> and <i>Ammonium Acetate</i> , Solution of.....	<i>Liquor Ferri et Ammonii Acetatis</i> , U. S. P.
<i>Iron</i> and <i>Ammonium Citrate</i>	<i>Ferri et Ammonii Citras</i> , U. S. P.
<i>Iron</i> and <i>Ammonium Tartrate</i>	<i>Ferri et Ammonii Tartas</i> , U. S. P. VIII.
<i>Iron</i> and <i>Manganese Iodides</i> , Syrup of.....	<i>Syrupus Ferri et Mangani Iodidi</i> , N. F.
<i>Iron</i> and <i>Potassium Tartrate</i>	<i>Ferri et Potassii Tartas</i> , U. S. P. VIII.
<i>Iron</i> and <i>Quinine Citrate</i>	<i>Ferri et Quininæ Citras</i> , U. S. P.
<i>Iron</i> and <i>Strychnine Citrate</i>	<i>Ferri et Strychninæ Citras</i> , U. S. P. VIII.
<i>Iron</i> , Bitter Wine of.....	<i>Vinum Ferri Amarum</i> , N. F.
<i>Iron</i> by Hydrogen.....	<i>Ferrum Reductum</i> , U. S. P.
<i>Iron</i> , Compound Pills of.....	<i>Pilulæ Ferri Compositæ</i> , N. F. III.
<i>Iron Lactate</i>	<i>Ferri Lactas</i> , N. F.
<i>Iron Lactate</i> , Elixir of.....	<i>Elixir Ferri Lactatis</i> , N. F.
<i>Iron Lactophosphate</i> , Syrup of.....	<i>Syrupus Ferri Lactophosphatis</i> , N. F.
<i>Iron Mixture</i> , Compound.....	<i>Mistura Ferri Composita</i> , N. F.
<i>Iron Perchloride</i>	<i>Ferri Chloridum</i> , U. S. P.
<i>Iron</i> , Pills of. (See under Pills of.)	
<i>Iron Plaster</i>	<i>Emplastrum Ferri</i> , N. F. III.
<i>Iron Proto-Sulphate</i>	<i>Ferri Sulphas</i> , U. S. P.
<i>Iron</i> , Reduced.....	<i>Ferrum Reductum</i> , U. S. P.
<i>Iron</i> , Quinine, and Strychnine, Elixir of.....	<i>Elixir Ferri Quininæ et Strychninæ</i> , N. F.
<i>Iron</i> , Quinine and Strychnine, Syrup of.....	<i>Syrupus Ferri Quininæ et Strychninæ Phosphatum</i> , N. F.
<i>Iron</i> , Syrup of Arsenate.....	<i>Syrupus Ferri Arsenatis</i> , N. F. III.
<i>Iron</i> , Syrup of Soluble Saccharated.....	<i>Syrupus Ferri Saccharati Solubilis</i> , N. F.
<i>Iron</i> , Troches of.....	<i>Trochisci Ferri</i> , N. F. III.
<i>Iron</i> , Wine of.....	<i>Vinum Ferri</i> , N. F.
<i>Isotonic Salt Solution</i>	<i>Liquor Sodii Chloridi Physiologicus</i> , U. S. P.
<i>Jaborandi</i>	<i>Pilocarpus</i> , U. S. P.
<i>Jackson's Pectoral Syrup</i>	<i>Syrupus Morphinæ et Acaciæ</i> , N. F.
<i>Jalap</i>	<i>Jalapa</i> , U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Jalap, Compound Powder of	Pulvis Jalapæ Compositus, U. S. P.
Jalap, Compound Tincture of.....	Tinctura Jalapæ Composita, N. F.
Jalap, Extract of.....	Extractum Jalapæ, N. F.
Jalap, Fluid extract of	Fluidextractum Jalapæ, N. F.
Jalap, Resin of.....	Resina Jalapæ, U. S. P.
Jalap, Tincture of.....	Tinctura Jalapæ, N. F.
James' Powder.....	Pulvis Antimonialis, N. F.
Jamestown Weed	Stramonium, U. S. P.
Janeway's Pills.....	Pilulæ Aloes et Podophylli Compositæ, N. F.
Javelle Water.....	Liquor Potassæ Chlorinatæ, N. F.
Jennerian Vaccine	Virus Vaccinicum, U. S. P.
Jimson Weed.....	Stramonium, U. S. P.
Jodetum Kalicum.....	Potassii Iodidum, U. S. P.
Jodetum Natricum.....	Sodii Iodidum, U. S. P.
<i>Juglans</i>	Juglans, N. F.
Juglans, Extract of.....	Extractum Juglandis, N. F. III.
Juglans, Fluidextract of.....	Fluidextractum Juglandis, N. F.
<i>Juniper Berries</i>	Juniper, N. F.
Juniper, Compound Spirit of.....	Spiritus Juniperi Compositus, U. S. P.
Juniper, Fluidextract of.....	Fluidextractum Juniperi, N. F.
Juniper Oil.....	Oleum Juniperi, U. S. P.
Juniper, Spirit of.....	Spiritus Juniperi, U. S. P.
Kali Causticum Fusum.....	Potassii Hydroxidum, U. S. P.
Kalium Bicarbonicum.....	Potassii Bicarbonas, U. S. P.
Kalium Bitartaricum.....	Potassii Bitartaras, U. S. P.
Kalium Bromatum.....	Potassii Bromidum, U. S. P.
Kalium Carbonicum.....	Potassii Carbonas, U. S. P.
Kalium Chloricum.....	Potassii Chloras, U. S. P.
Kalium Jodatum.....	Potassii Iodidum, U. S. P.
Kalium Natrio-tartaricum.....	Potassii et Sodii Tartaras, U. S. P.
Kalium Nitricum.....	Potassii Nitras, U. S. P.
Kalium Permanganicum.....	Potassii Permanganas, U. S. P.
<i>Kaolin</i>	Kaolinum, U. S. P.
Kaolin, Cataplasm of.....	Cataplasma Kaolini, N. F.
<i>Kava</i>	Kava, N. F.
Kava, Fluidextract of.....	Fluidextractum Kava, N. F.
Kava Kava.....	Kava, N. F.
Kentish's Liniment.....	Linimentum Terebinthinæ, U. S. P.
Kermes Mineral.....	Antimonium Sulphuratum, N. F.
Kieselguhr, Purified	Terra Silicea Purificata, U. S. P.
<i>Kino</i>	Kino, U. S. P.
Kino and Opium Compound Powder of ..	Pulvis Kino et Opii Compositus, N. F.
Kino and Opium, Compound Tincture of ..	Tinctura Kino et Opii Composita, N. F.
Kino, Tincture of.....	Tinctura Kino, U. S. P.
Kissingen Salt, Artificial.....	Sal Kissingense Factitium, N. F.
Kissingen Salt, Effervescent Artificial ..	Sal Kissingensis Factiti Effervescens, N. F.
<i>Kola</i>	Kola, N. F.
Kola, Fluidextract of.....	Fluidextractum Kolæ, N. F.
Kousoo.....	Brayera, N. F.
Kousoo, Fluidextract of.....	Fluidextractum Cusso, N. F. III.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Krameria</i>	<i>Krameria</i> , N. F.
<i>Krameria</i> , Extract of.....	<i>Extractum Krameriae</i> , N. F.
<i>Krameria</i> , Fluidextract of.....	<i>Fluidextractum Krameriae</i> , N. F.
<i>Krameria</i> , Fluidglycerate of.....	<i>Fluidglyceratum Krameriae</i> , N. F.
<i>Krameria</i> , Syrup of.....	<i>Syrupus Krameriae</i> , N. F.
<i>Krameria</i> , Tincture of.....	<i>Tinctura Krameriae</i> , N. F.
<i>Krameria</i> , Troches of.....	<i>Trochisci Krameriae</i> , U. S. P. VIII.
<i>Kresolum Crudum</i>	<i>Cresol</i> , U. S. P.
<i>Kreosotum</i>	<i>Creosotum</i> , U. S. P.
<i>Kumys</i>	<i>Lac Fermentatum</i> , N. F.
<i>Labarraque's Solution</i>	<i>Liquor Sodæ Chlorinatæ</i> , U. S. P.
<i>Lac Sulphuris</i>	<i>Sulphur Præcipitatum</i> , U. S. P.
<i>Lactic Acid</i>	<i>Acidum Lacticum</i> , U. S. P.
<i>Lactose</i>	<i>Saccharum Lactis</i> , U. S. P.
<i>Lactucarium</i>	<i>Lactucarium</i> , U. S. P.
<i>Lactucarium</i> , Tincture of.....	<i>Tinctura Lactucarii</i> , U. S. P.
<i>Lactucarium</i> , Syrup of.....	<i>Syrupus Lactucarii</i> , U. S. P.
<i>Lady Slipper Root</i>	<i>Cypripedium</i> , N. F.
<i>Lady Webster's Dinner Pill</i>	<i>Pilulæ Aloes et Mastiches</i> , N. F. (See also <i>Pilulæ Ad Prandium</i> , N. F.)
<i>Lafayette Mixture</i>	<i>Mistura Copaibæ</i> , N. F.
<i>Lamotte's Drops</i>	<i>Tinctura Ferri Chloridi Ætherea</i> , N. F.
<i>Lancaster Black Drop</i>	<i>Acetum Opii</i> , N. F.
<i>Lanolinum</i>	<i>Adeps Lanæ Hydrosus</i> , U. S. P.
<i>Lapis Calaminaris</i>	<i>Calamina Præparata</i> , N. F.
<i>Lappa</i>	<i>Lappa</i> , N. F.
<i>Lappa</i> , Fluidextract of.....	<i>Fluidextractum Lappæ</i> , N. F.
<i>Larch Agaric</i>	<i>Agaricus</i> , N. F.
<i>Larch Turpentine</i>	<i>Terebinthinæ Laricis</i> , N. F.
<i>Lard</i>	<i>Adeps</i> , U. S. P.
<i>Lard</i> , Benzoinated.....	<i>Adeps Benzoinatus</i> , U. S. P.
<i>Lard Oil</i>	<i>Oleum Adipis</i> , U. S. P. VIII.
<i>Larkspur Seed</i>	<i>Delphinium</i> , N. F.
<i>Larkspur</i> , Tincture of.....	<i>Tinctura Delphinii</i> , N. F.
<i>Lassar's Mild Resorcinol Paste</i>	<i>Pasta Resorcinolis Mitis</i> , N. F.
<i>Lassar's Naphthol Paste</i>	<i>Pasta Betanaphtholis</i> , N. F.
<i>Lassar's Stronger Resorcinol Paste</i>	<i>Pasta Resorcinolis Fortis</i> , N. F.
<i>Lassar's Zinc Paste</i>	<i>Pasta Zinci</i> , N. F.
<i>Lavender</i> , Compound Tincture of.....	<i>Tinctura Lavandulæ Composita</i> , U. S. P.
<i>Lavender Flowers</i> , Oil of.....	<i>Oleum Lavandulæ Florum</i> , U. S. P. VIII.
<i>Lavender</i> , Oil of.....	<i>Oleum Lavandulæ</i> , U. S. P.
<i>Lavender</i> , Spirit of.....	<i>Spiritus Lavandulæ</i> , U. S. P.
<i>Laxative Pills after Confinement</i>	<i>Pilulæ Laxativæ Post Partum</i> , N. F.
<i>Laxative Species</i>	<i>Species Laxativæ</i> , N. F.
<i>Lead Acetate</i>	<i>Plumbi Acetas</i> , U. S. P.
<i>Lead and Opium</i> , Lotion of.....	<i>Lotio Plumbi et Opii</i> , N. F.
<i>Lead and Opium Wash</i>	<i>Lotio Plumbi et Opii</i> , N. F.
<i>Lead Carbonate</i>	<i>Plumbi Carbonas</i> , N. F.
<i>Lead Iodide</i>	<i>Plumbi Iodidum</i> , N. F.
<i>Lead Iodidie</i> , Ointment of.....	<i>Unguentum Plumbi Iodidi</i> , N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Lead Nitrate</i>	Plumbi Nitras, U. S. P. VIII.
<i>Lead Oxide</i>	Plumbi Oxidum, U. S. P.
<i>Lead Plaster</i>	Emplastrum Plumbi, U. S. P.
<i>Lead Subacetate, Cerate of</i>	Ceratum Plumbi Subacetatis, N. F.
<i>Lead Subacetate, Diluted Solution of</i>	Liquor Plumbi Subacetatis Dilutis, U. S. P.
<i>Lead Subacetate, Liniment of</i>	Linimentum Plumbi Subacetatis N. F. III.
<i>Lead Subacetate, Solution of</i>	Liquor Plumbi Subacetatis, U. S. P.
<i>Lead Water</i>	Liquor Plumbi Subacetatis Dilutus, U. S. P.
<i>Lemon Juice</i>	Limonis Succus, U. S. P. VIII.
<i>Lemon Oil</i>	Oleum Limonis, U. S. P.
<i>Lemon Peel</i>	Limonis Cortex, U. S. P.
<i>Lemon Peel, Tincture of</i>	Tinctura Limonis Corticis, U. S. P.
<i>Lemon, Spirit of</i>	Spiritus Limonis, N. F. III.
<i>Leptandra</i>	Leptandra, N. F.
<i>Leptandra, Extract of</i>	Extractum Leptandræ, N. F.
<i>Leptandra, Fluid extract of</i>	Fluid extractum Leptandræ, N. F.
<i>Licorice</i>	Glycyrrhiza, U. S. P.
<i>Life Root</i>	Senecio, N. F.
<i>Light Liquid Petrolatum</i>	Petrolatum Liquidum, U. S. P.
<i>Light Magnesia</i>	Magnesi Oxidum, U. S. P.
<i>Lignum Quassiae</i>	Quassia, U. S. P.
<i>Lignum Santali Rubrum</i>	Santalum Rubrum, U. S. P.
<i>Lignum Vitæ</i>	Guaiaci Lignum, N. F.
<i>Lily-of-the-Valley Flowers</i>	Convallariz Flores, N. F.
<i>Lily-of-the-Valley Root</i>	Convallariz Radix, N. F.
<i>Lime</i>	Calx, U. S. P.
<i>Lime, Chlorinated Oxide of</i>	Calx Chlorinata, U. S. P.
<i>Lime Juice</i>	Succus Citri, N. F.
<i>Lime Juice and Pepsin</i>	Succus Citri et Pepsinum, N. F.
<i>Lime Liniment</i>	Linimentum Calcis, U. S. P.
<i>Lime, Soda With</i>	Soda cum Calce, N. F.
<i>Lime Water</i>	Liquor Calcis, U. S. P.
<i>Liniment, Ammonia</i>	Linimentum Ammoniz, U. S. P.
<i>Liniment, Belladonna</i>	Linimentum Belladonnæ, U. S. P.
<i>Liniment, Camphor</i>	Linimentum Camphoræ, U. S. P.
<i>Liniment, Cantharides</i>	Linimentum Cantharides, N. F. III.
<i>Liniment, Chloroform</i>	Linimentum Chloroformi, U. S. P.
<i>Liniment, Iodine</i>	Linimentum Iodi, N. F. III.
<i>Liniment, Lime</i>	Linimentum Calcis, U. S. P.
<i>Liniment of Aconite and Chloroform</i>	Linimentum Aconiti et Chloroformi, N. F.
<i>Liniment of Ammonium Iodide</i>	Linimentum Ammonii Iodidi, N. F.
<i>Liniment of Croton Oil</i>	Linimentum Tiglli, N. F.
<i>Liniment of Lead Subacetate</i>	Linimentum Plumbi Subacetatis, N. F. III.
<i>Liniment of Soft Soap</i>	Linimentum Saponis Mollis, U. S. P.
<i>Liniment of Soft Soap, Compound</i>	Linimentum Saponis Mollis, Compositum, N. F.
<i>Liniment, Soap</i>	Linimentum Saponis, U. S. P.
<i>Liniment, Turpentine</i>	Linimentum Terebinthinæ, U. S. P.
<i>Linimentum Album</i>	Linimentum Terebinthinæ Aceticum, N. F.
<i>Linimentum Ammoniatum</i>	Linimentum Ammoniz, U. S. P.
<i>Linimentum Crotonis</i>	Linimentum Tiglli, N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Linimentum Saponato-camphoratum	Linimentum Saponis, U. S. P.
Liquidum.	
<i>Linseed</i>	Linum, U. S. P.
<i>Linseed Oil</i>	Oleum Lini, U. S. P.
Liquefied Carbolic Acid.....	Phenol Liquefactum, U. S. P.
<i>Liquefied Phenol</i>	Phenol Liquefactum, U. S. P.
Liquid Apiol.....	Oleoresina Petroselinii, U. S. P.
Liquid Glucose.....	Glucosum, N. F.
Liquid Opodeldoc.....	Linimentum Saponis, U. S. P.
<i>Liquid Petrolatum</i>	Petrolatum Liquidum, U. S. P.
Liquid Petrox.....	Petroxolinum Liquidum, N. F.
<i>Liquid Petroxolin</i>	Petroxolinum Liquidum.
<i>Liquid Rennet</i>	Liquor Seriparus, N. F. III.
Liquid Storax.....	Styrax, U. S. P.
Liquor Ammonii Anisatus.....	Spiritus Ammonii Anisatus, N. F.
Liquor Arseni Bromidi.....	Liquor Potassii Arsenatis et Bromidi, N. F.
III.	
Liquor Arsenicalis, P. I.	Liquor Potassii Arsenitis, U. S. P.
Liquor Arseniitis Kalici.....	Liquor Potassii Arsenitis, U. S. P.
Liquor Burowii.....	Liquor Alumini Acetatis Crudus, N. F.
Liquor Cresoli Saponatus.....	Liquor Cresolis Compositus, U. S. P.
Liquor Ferri Sesquichlorati.....	Liquor Ferri Chloridi, U. S. P.
Liquorice Root.....	Glycyrrhiza, U. S. P.
Liquor Iodi Carbolatus, N. F. III.	Liquor Iodi Phenolatus, N. F.
Liquor Kali Caustici.....	Liquor Potassii Hydroxidi, U. S. P.
Liquor Kalii Arsenicosi P. I.	Liquor Potassii Arsenitis, U. S. P.
Liquor Natri Caustici.....	Liquor Sodii Hydroxidi, U. S. P.
Liquor Potassæ.....	Liquor Potassii Hydroxidi, U. S. P.
Liquor Potassæ Chloratæ.....	Liquor Potassæ Chlorinatæ, N. F.
Liquor Potassii Arsenatis et Bromidi,	Liquor Arsenicalis, Clemen's, N. F.
N. F. III.	
Liquor Soda.....	Liquor Sodii Hydroxidi, U. S. P.
Litharge.....	Plumbi Oxidum, U. S. P.
<i>Lithium Benzoate</i>	Lithii Benzoas, U. S. P. VIII.
<i>Lithium Bromide</i>	Lithii Bromidum, U. S. P.
Lithium Bromide, Elixir of.....	Elixir Lithii Bromidi, N. F.
<i>Lithium Carbonate</i>	Lithii Carbonas, U. S. P.
Lithium Carbonicum.....	Lithii Carbonas, U. S. P.
<i>Lithium Citrate</i>	Lithii Citras, U. S. P.
Lithium Citrate, Effervescent.....	Lithii Citras Effervescens, N. F.
Lithium Citrate, Elixir of.....	Elixir Lithii Citratis, N. F.
<i>Lithium Salicylate</i>	Lithii Salicylas, N. F.
Lithium Salicylate, Elixir of.....	Elixir Lithii Salicylatis, N. F.
Liver of Sulphur.....	Potassa Sulphurata, U. S. P.
<i>Lobelia</i>	Lobelia, U. S. P.
Lobelia, Tinctura, P. I.	Tinctura Lobeliæ, U. S. P.
Lobelia, Fluidextract of.....	Fluidextractum Lobeliæ, U. S. P.
Lobelia, Tincture of.....	Tinctura Lobeliæ, U. S. P.
Lobelia, Vinegar of.....	Acetum Lobeliæ, N. F. III.
Logwood.....	Hæmatoxylon, N. F.
London Paste.....	Soda cum Calce, N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Loomis' Diarrhoea Mixture.....	Misturæ Contra Diarrhœam, N. F. III.
Lotio Ammoniacalis Camphorata.....	Aqua Sedativa, N. F. III.
Lotion, Astringent.....	Lotio Adstringens, N. F. III.
Lotion, Black.....	Lotio Nigra, N. F.
Lotion of Lead and Opium.....	Lotio Plumbi et Opii, N. F.
Lotion, Yellow.....	Lotio Flava, N. F.
Lugol's Solution.....	Liquor Iodi Compositus, U. S. P.
Lunar Caustic.....	Argenti Nitras, Fusus, U. S. P.
Lupulin.....	Lupulinum, N. F.
Lupulin, Fluidextract of.....	Fluidextractum Lupulini, N. F.
Lupulin, Oleoresin of.....	Oleoresina Lupulini, N. F.
<i>Lycopodium</i>	Lycopodium, U. S. P.
<i>Mace</i>	Macis, N. F.
Macrotys.....	Cimicifuga, U. S. P.
Maderwort.....	Absinthium, N. F.
Magendie's Solution of Morphine.....	Liquor Morphinæ Hypodermicus, N. F. III.
Magnesia.....	Magnesiæ Oxidum, U. S. P.
Magnesia, Asafoetida and Opium, Mixture.....	Mistura Magnesiæ Asafoetidæ et Opii, N. F.
<i>Magnesia Magma</i>	Magma Magnesiæ, U. S. P.
Magnesia, Troches of.....	Trochisci Magnesiæ, N. F. III.
Magnesium Bromide, Solution of.....	Liquor Magnesiæ Bromidi, N. F. III.
<i>Magnesium Carbonate</i>	Magnesiæ Carbonas, U. S. P.
Magnesium Carbonicum.....	Magnesiæ Carbonas, U. S. P.
<i>Magnesium Chloride</i>	Magnesiæ Chloridum, N. F.
Magnesium Citrate, Effervescent.....	Magnesiæ Citras, Effervescens, N. F. III.
Magnesium Citrate, Solution of.....	Liquor Magnesiæ Citratæ, U. S. P.
<i>Magnesium Oxide</i>	Magnesiæ Oxidum, U. S. P.
Magnesium Oxide, Heavy.....	Magnesiæ Oxidum Ponderosum, U. S. P.
Magnesium Oxydatum.....	Magnesiæ Oxidum, U. S. P.
Magnesium Sulfuricum.....	Magnesiæ Sulphas, U. S. P.
<i>Magnesium Sulphate</i>	Magnesiæ Sulphas, U. S. P.
Magnesium Sulphate, Effervescent Solution of.....	Liquor Magnesiæ Sulphatis Effervescens, N. F.
Malabar Kino.....	Kino, U. S. P.
Male Fern.....	Aspidium, U. S. P.
Male Fern, Oleoresin of.....	Oleoresina Aspidii, U. S. P.
<i>Mallow Leaves</i>	Malva Folia, N. F.
<i>Malt</i>	Maltum, U. S. P.
Malt and Iron, Elixir of.....	Elixir Malti et Ferri, N. F. III.
Malt, Extract of.....	Extractum Malti, U. S. P.
Malt, Fluidextract of.....	Fluidextractum Malti, N. F. III.
Mandrake.....	Podophyllum, U. S. P.
Manganese and Sodium Citrate.....	Mangani et Sodii Citras, N. F.
Manganese Glycerophosphate, Soluble.....	Mangani Glycerophosphas Solubilis, N. F.
<i>Manganese Hypophosphite</i>	Mangani Hypophosphis, N. F.
<i>Manganese Sulphate</i>	Mangani Sulphas, N. F.
Manganous Glycerinophosphate.....	Mangani Glycerophosphas Solubilis, N. F.
<i>Manna</i>	Manna, U. S. P.
Manna, Syrup of.....	Syrupus Mannæ, N. F.
Marigold.....	Calendula, N. F.
<i>Marrubium</i>	Marrubium, N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Marsh Mallow Leaves.....	Althææ Folia, N. F.
Marsh Mallow Root.....	Althæa, U. S. P.
Mass of Copaiba.....	Massa Copaibæ, N. F.
Mass of Ferrous Carbonate.....	Massa Ferri Carbonatis, U. S. P.
Mass of Mercury.....	Massa Hydrargyri, U. S. P.
Mastic.....	Mastiche, N. F.
Matico.....	Matico, N. F.
Matico, Fluidextract of.....	Fluidextractum Matico, N. F.
Matico, Tincture of.....	Tinctura Matico, N. F. III.
Matricaria.....	Matricaria, U. S. P.
May Apple Rhizome.....	Podophyllum, U. S. P.
Meadow Anemone.....	Pulsatilla, N. F.
Medicated Waters.....	Aquæ, U. S. P. VIII.
Mel Boracis.....	Mel Sodii Boratis, N. F. IV.
Melilot.....	Melilotus, N. F.
Menispermum, Fluidextract of.....	Fluidextractum Menispermis, N. F. III.
Menthol.....	Menthol, U. S. P.
Menthol, Camphor and.....	
Menthol, Camphorated.....	Menthol Camphoratum, N. F.
Menthol Inunction.....	Inunctum Mentholis, N. F.
Menthol Inunction, Compound.....	Inunctum Mentholis Compositum, N. F.
Menthol Petrox.....	Petroxolinum Mentholis, N. F.
Menthol Petrozolin.....	Petroxolinum Mentholis, N. F.
Menthol Spray.....	Nebula Mentholis, N. F.
Menthol Spray, Compound.....	Nebula Mentholis, Composita, N. F.
Menyanthes Leaves.....	Menyanthes, N. F.
Menyanthes, Fluidextract of.....	Fluidextractum Menyanthes, N. F. III.
Mercurial Plaster.....	Emplastrum Hydrargyri, U. S. P. VIII.
Mercurial Ointment.....	Unguentum Hydrargyri, U. S. P.
Mercurial Ointment, Diluted.....	Unguentum Hydrargyri Dilutum, U. S. P.
Mercuric Chloride.....	Hydrargyri Chloridum Corrosivum, U. S. P.
Mercuric Iodide.....	Hydrargyri Iodidum Rubrum, U. S. P.
Mercuric Nitrate, Ointment of.....	Unguentum Hydrargyri Nitratis, U. S. P.
Mercuric Nitrate, Solution of.....	Liquor Hydrargyri Nitratis, N. F.
Mercuric Oxide, Red.....	Hydrargyri Oxidum Rubrum, U. S. P.
Mercuric Oxide, Yellow.....	Hydrargyri Oxidum Flavum, U. S. P.
Mercuric Salicylate.....	Hydrargyri Salicylas, U. S. P.
Mercuric Subsalicylate.....	Hydrargyri Salicylas, U. S. P.
Mercuric Subsulphate, Yellow.....	Hydrargyri Subsulphas, Flavus, N. F. III.
Mercurous Chloride.....	Hydrargyri Chloridum Mite, U. S. P.
Mercurous Chloride and Jalap, Powder of Mild.....	Pulvis Hydrargyri Chloridi Mitis et Jalapæ, N. F.
Mercurous Iodide.....	Hydrargyri Iodidum Flavum, U. S. P.
Mercury.....	Hydrargyrum, U. S. P.
Mercury and Potassium Iodides, Solution of.....	Liquor Hydrargyri et Potassii Iodidi, N. F.
Mercury, Mass of.....	Massa Hydrargyri, U. S. P.
Mercury, Ointment of Ammoniated.....	Unguentum Hydrargyri Ammoniati, U. S. P.
Mercury, Oleate of.....	Oleatum Hydrargyri, U. S. P.
Mercury Petrox.....	Petroxolinum Hydrargyri, N. F.
Mercury Petrozolin.....	Petroxolinum Hydrargyri, N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Mercury with Chalk</i>	Hydrargyrum cum Creta, U. S. P.
<i>Metadihydroxybenzene</i>	Resorcinol, U. S. P.
<i>Metallic Pills</i>	Pilulæ Ferri, Quininæ, Strychninæ et Arseni Fortiores, N. F.
<i>Metaphosphoric Acid, Diluted</i>	Acidum Metaphosphoricum Dilutum, N. F. III.
<i>Methylene Blue</i>	Methylthioninæ Chloridum, U. S. P.
<i>Methylmorphine</i>	Codeina, U. S. P.
<i>Methyl Salicylate</i>	Methylis Salicylas, U. S. P.
<i>Methyl Salicylate Petrox</i>	Petroxolinum Methylis Salicylatis.
<i>Methyl Salicylate Petroxolin</i>	Petroxolinum Methylis Salicylatis, N. F.
<i>Methyl Sulphonol</i>	Sulphonethylmethanum, U. S. P.
<i>Methylthionine Chloride</i>	Methylthioninæ Chloridum, U. S. P.
<i>Methylthionine Hydrochloride</i>	Methylthioninæ Chloridum, U. S. P.
<i>Methysticum</i>	Kava, N. F.
<i>Metramine</i>	Hexamethylenamina, U. S. P.
<i>Mezereon</i>	Mezereum, U. S. P.
<i>Mezereum</i>	Mezereum, U. S. P.
<i>Mezereum, Fluidextract of</i>	Fluidextractum Mezerei, N. F.
<i>Mezereum Ointment</i>	Unguentum Mezerei, N. F. III.
<i>Mild Mercurous Chloride</i>	Hydrargyri Chloridum Mite, U. S. P.
<i>Mild Pills of Iron, Quinine, Strychnine and Arsenic</i>	Pilulæ Ferri, Quininæ, Strychninæ et Arseni Mitis, N. F.
<i>Mild Resorcinol Paste</i>	Pasta Resorcinolis Mitis, N. F.
<i>Milk, Cows</i>	Lac Vaccinum, N. F.
<i>Milk, Fermented</i>	Lac Fermentatum, N. F.
<i>Milk, Humanized</i>	Lac Humanisatum, N. F. III.
<i>Milk of Almond</i>	Emulsum Amygdalæ, U. S. P.
<i>Milk of Asafetida</i>	Emulsum Asafetidæ, U. S. P.
<i>Milk of Bismuth</i>	Magma Bismuthi, U. S. P.
<i>Milk of Magnesia</i>	Magma Magnesicæ, U. S. P.
<i>Milk of Sulphur</i>	Sulphur Præcipitatum, U. S. P.
<i>Milk Powder</i>	Pulvis Pro Lacte Humanisato, N. F. III.
<i>Milk Powder, Humanizing</i>	Pulvis Pro Lacte Humanisato, N. F. III.
<i>Milk Sugar</i>	Saccharum Lactis, U. S. P.
<i>Mistura Ammoniaci</i>	Emulsum Ammoniaci, N. F. III.
<i>Mistura Antidysenterica</i>	Mistura Camphoræ Acida, N. F.
<i>Mistura Astringens et Escharotica, N. F.</i>	Mistura Adstringens, N. F.
<i>Mistura Opii Alkalina</i>	Mistura Opii et Sassafras, N. F.
<i>Mistura Phosphatica</i>	Emulsum Phosphaticum, N. F. III.
<i>Mistura Picis Liquidæ, N. F.</i>	Mistura Olei Picis, N. F.
<i>Mistura Rhei et Sodæ, U. S. P. VIII</i>	Mistura Rhei Composita, N. F.
<i>Mistura Sassafras et Opii, N. F. III.</i> ..	Mistura Opii et Sassafras, N. F.
<i>Mistura Sodæ et Menthæ, N. F. III.</i> ..	Liquor Sodæ et Menthæ, N. F.
<i>Mistura Sodii Citratis</i>	Liquor Sodii Citratis, N. F.
<i>Mistura Solvens Simplex</i>	Mistura Ammonii Chloridi, N. F.
<i>Mitigated Silver Nitrate</i>	Argenti Nitras Mitigatus, U. S. P. VIII.
<i>Mixtura Gummosa</i>	Mistura Acaciæ, N. F. III.
<i>Mixture, Astringent</i>	Mistura Adstringens, N. F.
<i>Mixture, Carminative</i>	Mistura Carminative, N. F.
<i>Mixture, Chalk</i>	Mistura Cretæ, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Mixture, Copaiba.	Mistura Copaibæ, N. F.
Mixture of Acacia.	Mistura Acaciæ, N. F. III.
Mixture of Ammonium Chloride.	Mistura Ammonii Chloridi, N. F.
Mixture of Chloral and Bromide, Compound.	Mistura Chlorali et Potassi Bromidi Composita, N. F.
Mixture of Chloroform and Morphine, Compound.	Mistura Chloroformi et Morphina Composita, N. F.
Mixture of Copaiba and Opium.	Mistura Copaibæ et Opii, N. F.
Mixture of Glycyrrhiza, Compound.	Mistura Glycyrrhizæ Composita, U. S. P.
Mixture of Guaiac.	Mistura Guaiaci, N. F.
Mixture of Magnesia and Asafetida.	Mistura Magnesiae Asafetidæ et Opii, N. F.
Mixture of Magnesia, Asafetida and Opium.	Mistura Magnesiae Asafetidæ et Opii, N. F.
Mixture of Oil of Tar.	Mistura Olei Picis, N. F.
Mixture of Opium and Chloroform, Compound.	Mistura Opii et Chloroformi Composita, N. F.
Mixture of Opium and Rhubarb, Compound.	Mistura Opii et Rhei Composita, N. F.
Mixture of Opium and Sassafras.	Mistura Opii et Sassafras, N. F.
Mixture of Rhubarb, Alkaline.	Mistura Rhei Alkalina, N. F. IV.
Mixture of Rhubarb and Soda.	Mistura Rhei Composita, N. F.
Mixture of Rhubarb, Compound.	Mistura Rhei Composita, N. F.
Mixture, Oleobalsamic.	Mistura Oleo-Balsamica, N. F.
Mixture, Squibb's Diarrhœa.	Mistura Opii et Chloroformi Composita, N. F.
Mixture, Sulphuric Acid.	Mistura Sulphurica Acida, N. F. III.
Mixture, Tar.	Mistura Oei Picis, N. F.
Monkshood.	Aconitum, U. S. P.
Monobromated Camphor.	Camphora Monobromata, U. S. P.
Monoethylmorphine Hydrochloride.	Æthylmorphinæ Hydrochloridum, U. S. P.
Monohydrated Sodium Carbonate.	Sodii Carbonas Monohydratus, U. S. P.
Monseil's Solution.	Liquor Ferri Subsulphatis, U. S. P.
Morphine.	Morphina, U. S. P.
Morphine Acetate.	Morphinæ Acetas, U. S. P. VIII.
Morphine and Acacia, Syrup of.	Syrupus Morphinæ et Acaciæ, N. F.
Morphine and Ipecac, Troches of.	Trochisci Morphinæ et Ipecacuanhæ, N. F. III.
Morphine Chloride.	Morphinæ Hydrochloridum, U. S. P.
Morphine Citrate, Solution of.	Liquor Morphinæ Citratis, N. F. III.
Morphine, Compound Syrup of.	Syrupus Morphinæ Compositus, N. F. III.
Morphine Hydrochloride.	Morphinæ Hydrochloridum, U. S. P.
Morphine, Hypodermic Solution of.	Liquor Morphinæ Hypodermicus, N. F. III.
Morphine Sulphate.	Morphinæ Sulphas, U. S. P.
Morphine Sulphate, Syrup of.	Syrupus Morphinæ Sulphatis, N. F. III.
Morphinum Hydrochloricum.	Morphinæ Hydrochloridum, U. S. P.
Morphinum Sulfuricum.	Morphinæ Sulphas, U. S. P.
Mother's Salve.	Unguentum Fuscum, N. F.
Moulded Silver Nitrate.	Argenti Nitras Fusus, U. S. P.
Mucilage of Acacia.	Mucilago Acaciæ, U. S. P.
Mucilage of Chondrus.	Mucilago Chondri, N. F.
Mucilage of Cydonium.	Mucilago Cydonii, N. F. III.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Mucilage of Dextrin</i>	Mucilago Dextrini, N. F. III.
<i>Mucilage of Elm</i>	Mucilago Ulmi, U. S. P. VIII.
<i>Mucilage of Salep</i>	Mucilago Salep, N. F. III.
<i>Mucilage of Sassafras Pith</i>	Mucilago Sassafras Medullæ, N. F.
<i>Mucilage of Tragacanth</i>	Mucilago Tragacanthæ, U. S. P.
<i>Mucilago Gummi Arabici</i>	Mucilago Acaciæ, U. S. P.
<i>Mull, Corrosive Mercuric Chloride</i>	Mulla Hydrargyri Chloridi Corrosivi, N. F.
<i>Mullein Flowers</i>	Verbasci Flores, N. F.
<i>Mullein Leaves</i>	Verbasci Folia, N. F.
<i>Mulls</i>	Mullæ, N. F.
<i>Mull, Salicylated Creosote</i>	Mulla Creosoti Salicylata, N. F.
<i>Mull, Salicylic Acid</i>	Mulla Acidi Salicylici, N. F.
<i>Muriatic Acid</i>	Acidum Hydrochloricum, U. S. P.
<i>Must</i>	Moschus, U. S. P.
<i>Musk Root</i>	Sumbul, U. S. P.
<i>Musk, Tincture of</i>	Tinctura Moschi, U. S. P.
<i>Mustard, Black</i>	Sinapis, Nigra, U. S. P.
<i>Mustard, Compound Liniment of</i>	Linimentum Sinapis Compositum, N. F.
<i>Mustard Oil</i>	Oleum Sinapis Volatile, U. S. P.
<i>Mustard Paper</i>	Emplastrum Sinapis, U. S. P.
<i>Mustard Plaster</i>	Emplastrum Sinapis, U. S. P.
<i>Mustard, Spirit of</i>	Spiritus Sinapis, N. F.
<i>Mustard, White</i>	Sinapis Alba, U. S. P.
<i>Mutton Suet</i>	Sevum Præparatum, U. S. P.
<i>Myrcia, Compound Spirit of</i>	Spiritus Myrciæ Compositus, N. F.
<i>Myrcia, Oil of</i>	Oleum Myrciæ, N. F.
<i>Myristica</i>	Myristica, U. S. P.
<i>Myristica Oil</i>	Oleum Myristicæ, U. S. P.
<i>Myrrh</i>	Myrrha, U. S. P.
<i>Myrrh, Tincture of</i>	Tinctura Myrrhæ, U. S. P.
<i>Naphthalene</i>	Naphthalenum, U. S. P. VIII.
<i>Naphthalin, Iodoform</i>	Pulvis Iodoformi Compositus, N. F. III.
<i>Naphthol</i>	Betanaphthol, U. S. P.
<i>Naphthol Paste</i>	Pasta Betanaphtholis, N. F.
<i>Naphthol Paste, Lassar's</i>	Pasta Betanaphtholis, N. F.
<i>Naphtholum</i>	Betanaphthol, U. S. P.
<i>Natrium Aceticum</i>	Sodii Acetas, U. S. P.
<i>Natrium Arsenicum, P. I.</i>	Sodii Arsenas, U. S. P.
<i>Natrium Benzoicum</i>	Sodii Benzoas, U. S. P.
<i>Natrium Bicarbonicum</i>	Sodii Bicarbonas, U. S. P.
<i>Natrium Bromatum</i>	Sodii Bromidum, U. S. P.
<i>Natrium Carbonicum</i>	Sodii Carbonas Monohydratus, U. S. P.
<i>Natrium Causticum</i>	Sodii Hydroxidum, U. S. P.
<i>Natrium Chloratum</i>	Sodii Chloridum, U. S. P.
<i>Natrium Jodatium</i>	Sodii Iodidum, U. S. P.
<i>Natrium Nitrosum</i>	Sodii Nitris, U. S. P.
<i>Natrium Phosphoricum</i>	Sodii Phosphas, U. S. P.
<i>Natrium Phosphoricum Siccum</i>	Sodii Phosphas Exsiccatus, U. S. P.
<i>Natrium Salicylicum</i>	Sodii Salicylas, U. S. P.
<i>Natrium Sulfuricum</i>	Sodii Sulphas, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Natrium Thiosulphuricum.....	Sodii Thiosulphas, U. S. P.
Nepeta.....	Cataria, N. F.
Neutralizing Cordial.....	Mistura Rhei Alkalina, N. F.
Niemeyer Pills for Dropsy.....	Pilulæ Digitalis, Scillæ et Hydrargyri, N. F.
Niemeyer Pills for Phthisis.....	Pilulæ Opii, Digitalis et Quininae, N. F.
Night Blooming Cereus.....	Cactus Grandiflorus, N. F.
Nitras Agenticus.....	Argenti Nitras, U. S. P.
Nitras Kalicus.....	Potassii Nitras, U. S. P.
Nitric Acid.....	Acidum Nitricum, U. S. P.
Nitric Acid, Diluted.....	Acidum Nitricum Dilutum, U. S. P. VIII.
Nitris Amylicus.....	Amylis Nitris, U. S. P.
Nitrogen Monoxide.....	Nitrogenii Monoxidum, U. S. P.
Nitrohydrochloric Acid.....	Acidum Nitrohydrochloricum, U. S. P.
Nitrohydrochloric Acid, Diluted.....	Acidum Nitrohydrochloricum Dilutum, U. S. P.
Nitromuriatic Acid.....	Acidum Nitrohydrochloricum, U. S. P.
Nitromuriatic Acid, Diluted.....	Acidum Nitrohydrochloricum, Dilutum, U. S. P.
Nitrous Ether, Spirit of.....	Spiritus Ætheris, U. S. P.
Nitrous Oxide.....	Nitrogenii Monoxidum, U. S. P.
Normal Saline Solution.....	Liquor Sodii Chloridi Physiologicus, U. S. P.
Normal Salt Solution.....	Liquor Sodii Chloridi Physiologicus, U. S. P.
Nutgall.....	Galla, U. S. P.
Nutgall Ointment.....	Unguentum Gallæ, U. S. P.
Nutgall, Tincture of.....	Tinctura Gallæ, N. F.
Nutmeg.....	Myristica, U. S. P.
Nutmeg, Spirit of.....	Spiritus Myristicæ, N. F. III.
Nux Vomica.....	Nux Vomica, U. S. P.
Nux Vomica, Extract of.....	Extractum Nucis Vomicae, U. S. P.
Nux Vomica, Fluidextract of.....	Fluidextractum Nucis Vomicae, U. S. P.
Nux Vomica, Tincture of.....	Tinctura Nucis Vomicae, U. S. P.
Oak Bark, White.....	Quercus, N. F.
Oil, Castor.....	Oleum Ricini, U. S. P.
Oil, Cod Liver.....	Oleum Morrhuae, U. S. P.
Oil, Cottonseed.....	Oleum Gossypii Seminis, U. S. P.
Oil, Croton.....	Oleum Tiglii, U. S. P.
Oil, Ethereal.....	Oleum Æthereum, N. F.
Oil, Linseed.....	Oleum Lini, U. S. P.
Oil of Allspice.....	Oleum Pimentæ, U. S. P.
Oil of Almond, Expressed.....	Oleum Amygdalæ Expressum, U. S. P.
Oil of American Wormseed.....	Oleum Chenopodii, U. S. P.
Oil of Anise.....	Oleum Anisi, U. S. P.
Oil of Bay.....	Oleum Myrciæ, N. F.
Oil of Bergamot.....	Oleum Bergamottæ, N. F.
Oil of Bitter Almond.....	Oleum Amygdalæ Amarae, U. S. P.
Oil of Bitter Orange.....	Oleum Aurantii Amari, N. F.
Oil of Cade.....	Oleum Cadinum, U. S. P.
Oil of Cajuput.....	Oleum Cajuputi, U. S. P.
Oil of Caraway.....	Oleum Cari, U. S. P.
Oil of Cardamom.....	Oleum Cardamomi, N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Oil of Chenopodium</i>	<i>Oleum Chenopodii</i> , U. S. P.
<i>Oil of Cinnamon</i>	<i>Oleum Cassiæ</i> , U. S. P.
<i>Oil of Clove</i>	<i>Oleum Caryophylli</i> , U. S. P.
<i>Oil of Copaiba</i>	<i>Oleum Copaibæ</i> , U. S. P. VIII.
<i>Oil of Coriander</i>	<i>Oleum Coriandri</i> , U. S. P.
<i>Oil of Cubeb</i>	<i>Oleum Cubebæ</i> , U. S. P.
<i>Oil of Dwarf Pine Needles</i>	<i>Oleum Pini Pumilionis</i> , U. S. P.
<i>Oil of Erigeron</i>	<i>Oleum Erigerontis</i> , U. S. P. VIII.
<i>Oil of Eucalyptus</i>	<i>Oleum Eucalypti</i> , U. S. P.
<i>Oil of Fennel</i>	<i>Oleum Foeniculi</i> , U. S. P.
<i>Oil of Flaxseed</i>	<i>Oleum Lini</i> , U. S. P.
<i>Oil of Hedeoma</i>	<i>Oleum Hedeomæ</i> , U. S. P. VIII.
<i>Oil of Hyoscyamus, Compound</i>	<i>Oleum Hyoscyami Compositum</i> , N. F.
<i>Oil of Juniper</i>	<i>Oleum Juniperi</i> , U. S. P.
<i>Oil of Juniper Berries</i>	<i>Oleum Juniperi</i> , U. S. P.
<i>Oil of Juniper Tar</i>	<i>Oleum Cadinum</i> , U. S. P.
<i>Oil of Lavender</i>	<i>Oleum Lavandulæ</i> , U. S. P.
<i>Oil of Lavender Flowers</i>	<i>Oleum Lavandulæ Florum</i> , U. S. P. VIII.
<i>Oil of Lemon</i>	<i>Oleum Limonis</i> , U. S. P.
<i>Oil of Myrcia</i>	<i>Oleum Myrciæ</i> , N. F.
<i>Oil of Myristica</i>	<i>Oleum Myristicæ</i> , U. S. P.
<i>Oil of Mustard, Volatile</i>	<i>Oleum Sinapis Volatile</i> , U. S. P.
<i>Oil of Neroli</i>	<i>Oleum Aurantii Florum</i> , N. F.
<i>Oil of Nutmeg</i>	<i>Oleum Myristicæ</i> , U. S. P.
<i>Oil of Orange</i>	<i>Oleum Aurantii</i> , U. S. P.
<i>Oil of Orange Flowers</i>	<i>Oleum Aurantii Florum</i> , N. F.
<i>Oil of Peppermint</i>	<i>Oleum Menthæ Piperitæ</i> , U. S. P.
<i>Oil of Pimenta</i>	<i>Oleum Pimentæ</i> , U. S. P.
<i>Oil of Rose</i>	<i>Oleum Rosæ</i> , U. S. P. VIII.
<i>Oil of Rosemary</i>	<i>Oleum Rosmarini</i> , U. S. P.
<i>Oil of Sandalwood</i>	<i>Oleum Santali</i> , U. S. P.
<i>Oil of Santal</i>	<i>Oleum Santali</i> , U. S. P.
<i>Oil of Sassafras</i>	<i>Oleum Sassafras</i> , U. S. P.
<i>Oil, Sesame</i>	<i>Oleum Sesami</i> , U. S. P.
<i>Oil of Savin</i>	<i>Oleum Sabinæ</i> , U. S. P. VIII.
<i>Oil of Spearmint</i>	<i>Oleum Menthæ Viridis</i> , U. S. P.
<i>Oil of Star Anise</i>	<i>Oleum Anisi</i> , U. S. P.
<i>Oil of Sweet Almond</i>	<i>Oleum Amygdalæ Expressum</i> , U. S. P.
<i>Oil of Sweet Birch</i>	<i>Methylis Salicylas</i> , U. S. P.
<i>Oil of Sweet Orange</i>	<i>Oleum Aurantii</i> , U. S. P.
<i>Oil of Tar, Mixture of</i>	<i>Mistura Olei Picis</i> , N. F.
<i>Oil of Tar, Rectified</i>	<i>Oleum Picis Liquidæ Rectificatum</i> , U. S. P.
<i>Oil of Teaberry</i>	<i>Methylis Salicylas</i> , U. S. P.
<i>Oil of Theobroma</i>	<i>Oleum Theobromatis</i> , U. S. P.
<i>Oil of Thyme</i>	<i>Oleum Thymi</i> , U. S. P.
<i>Oil of Turpentine</i>	<i>Oleum Terebinthinæ</i> , U. S. P.
<i>Oil of Turpentine, Emulsion of</i>	<i>Emulsum Olei Terebinthinæ</i> , U. S. P.
<i>Oil of Turpentine, Rectified</i>	<i>Oleum Terebinthinæ Rectificatum</i> , U. S. P.
<i>Oil of Wintergreen</i>	<i>Methylis Salicylas</i> , U. S. P.
<i>Oil, Olive</i>	<i>Oleum Olivæ</i> , U. S. P.
<i>Oil, Phenolated</i>	<i>Oleum Phenolatum</i> , N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Oil, Phosphorated, N. F.	Oleum Phosphoratum, N. F.
Oils, Infused	Olea Infusa, N. F.
Oil-Sugars	Oleosacchara, N. F.
Ointment	Unguentum, U. S. P.
Ointment, Alkaline Sulphur	Unguentum Sulphuris Alkalinum, N. F.
Ointment, Belladonna	Unguentum Belladonnæ, U. S. P.
Ointment, Brown	Unguentum Fuscum, N. F.
Ointment, Calamine	Unguentum Calaminæ, N. F.
Ointment, Camphor	Unguentum Camphoræ, N. F.
Ointment, Chrysarobin	Unguentum Chrysarobini, U. S. P.
Ointment, Compound Resorcinol	Unguentum Resorcinolis Compositum, N. F.
Ointment, Compound Sulphur	Unguentum Sulphuris Compositum, N. F.
Ointment, Compound Tar	Unguentum Picis Compositum, N. F.
Ointment, Diachylon	Unguentum Diachylon, U. S. P.
Ointment, Diluted Mercurial	Unguentum Hydrargyri Dilutum, U. S. P.
Ointment, Iodine	Unguentum Iodi, U. S. P.
Ointment Iodoform	Unguentum Iodoformi, U. S. P.
Ointment Mercurial	Unguentum Hydrargyri, U. S. P.
Ointment, Nutgall	Unguentum Gallæ, U. S. P.
Ointment of Ammoniated Mercury	Unguentum Hydrargyri Ammoniatum, U. S. P.
Ointment of Boric Acid	Unguentum Acidi Borici, U. S. P.
Ointment of Carbolic Acid	Unguentum Phenolis.
Ointment of Gallic Acid	Unguentum Acidi Gallici, N. F. III.
Ointment of Lead Carbonate	Unguentum Plumbi Carbonatis, N. F. III.
Ointment of Lead Iodide	Unguentum Plumbi Iodidi, N. F.
Ointment of Mercuric Nitrate	Unguentum Hydrargyri Nitratis, U. S. P.
Ointment of Red Mercuric Oxide	Unguentum Hydrargyri Oxidi Rubri, N. F.
Ointment of Phenol	Unguentum Phenolis, U. S. P.
Ointment of Potassium Iodide	Unguentum Potassii Iodidi, N. F.
Ointment of Rose Water	Unguentum Aquæ Rosæ, U. S. P.
Ointment of Tannic Acid	Unguentum Acidi Tannici, U. S. P.
Ointment of Yellow Mercuric Oxide	Unguentum Hydrargyri Oxidi Flavi, U. S. P.
Ointment of Zinc Oxide	Unguentum Zinci Oxidi, U. S. P.
Ointment of Zinc Stearate	Unguentum Zinci Stearatis, N. F.
Ointment, Stramonium	Unguentum Stramonii, U. S. P.
Ointment, Sulphur	Unguentum Sulphuris, U. S. P.
Ointment, Tar	Unguentum Picis Liquidæ, U. S. P.
Ointment, Veratrine	Unguentum Veratrinæ, N. F.
Oleate of Aconitine	Oleatum Aconitinæ, N. F.
Oleate of Atropine	Oleatum Atropinæ, N. F.
Oleate of Cocaine	Oleatum Cocainæ, N. F.
Oleate of Mercury	Oleatum Hydrargyri, U. S. P.
Oleate of Quinine	Oleatum Quininæ, N. F.
Oleate of Veratrine	Oleatum Veratrinæ, N. F.
Oleate of Zinc	Oleatum Zinci, N. F. III.
Oleic Acid	Acidum Oleicum, U. S. P.
Oleo-Balsamic Mixture	Mistura Oleo-Balsamica, N. F.
Oleoresin of Aspidium	Oleoresina Aspidii, U. S. P.
Oleoresin of Capsicum	Oleoresina Capsici, U. S. P.
Oleoresin of Cubebs	Oleoresina Cubebæ, U. S. P.
Oleoresin of Ginger	Oleoresina Zingiberis, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Oleoresin of Lupulin</i>	<i>Oleoresina Lupulini</i> , N. F.
<i>Oleoresin of Male Fern</i>	<i>Oleoresina Aspidii</i> , U. S. P.
<i>Oleoresin of Parsley Fruit</i>	<i>Oleoresina Petroselini</i> , U. S. P.
<i>Oleoresin of Pepper</i>	<i>Oleoresina Piperis</i> , U. S. P.
<i>Oleo-Stearate of Zinc</i>	<i>Zinci-Oleo Stearas</i> , N. F. III.
<i>Oleum Amygdalarum</i>	<i>Oleum Amygdalæ Expressum</i> , U. S. P.
<i>Oleum Aurantii Corticis</i> , U. S. P. VIII.	<i>Oleum Aurantii</i> , U. S. P.
<i>Oleum Betulæ</i> , U. S. P. VIII.	<i>Methylis Salicylas</i> , U. S. P.
<i>Oleum Cacao</i>	<i>Oleum Theobromatis</i> , U. S. P.
<i>Oleum Camphoratum</i>	<i>Linimentum Camphoræ</i> , U. S. P.
<i>Oleum Carbolatum</i> , N. F. III.	<i>Oleum Phenolatum</i> , N. F.
<i>Oleum Carvi</i>	<i>Oleum Cari</i> , U. S. P.
<i>Oleum Crotonis</i>	<i>Oleum Tiglii</i> , U. S. P.
<i>Oleum Gaultheriæ</i> , U. S. P. VIII.	<i>Methylis Salicylas</i> , U. S. P.
<i>Oleum Jecoris Aselli</i>	<i>Oleum Morrhuæ</i> , U. S. P.
<i>Oleum Juniperi Empyreumaticum</i>	<i>Oleum Cadinum</i> , U. S. P.
<i>Oleum Lavendulæ Florum</i> , U. S. P.	<i>Oleum Lavendulæ</i> , U. S. P.
VIII.	
<i>Oleum Olivarum</i>	<i>Oleum Olivæ</i> , U. S. P.
<i>Oleum Rusci Rectificatum</i>	<i>Oleum Betulæ Empyreumaticum Rectificatum</i> , N. F.
<i>Oleum Sinapis Aethereum</i>	<i>Oleum Sinapis Volatile</i> , U. S. P.
<i>Olive Oil</i>	<i>Oleum Olivæ</i> , U. S. P.
<i>Ophthalmic Spirit</i>	<i>Spiritus Ophthalmicus</i> , N. F. III.
<i>Opium et Ipecacuanhæ Pulvis Compositus</i> , P. I.	<i>Pulvis Ipecacuanhæ et Opium</i> , U. S. P.
<i>Opium Extractum</i> P. I.	<i>Extractum Opium</i> , U. S. P.
<i>Opium Tinctura</i> P. I.	<i>Tinctura Opium</i> , U. S. P.
<i>Opium Tinctura Benzoinica</i> , P. I.	<i>Tinctura Opium Camphorata</i> , U. S. P.
<i>Opium</i>	<i>Opium</i> , U. S. P.
<i>Opium and Chloroform, Compound Mixture of</i> .	<i>Mistura Opium et Chloroformi Composita</i> , N. F.
<i>Opium and Rhubarb, Compound Mixture of</i> .	<i>Mistura Opium et Rhei Composita</i> , N. F.
<i>Opium and Sassafras, Mixture of</i>	<i>Mistura Opium et Sassafras</i> , N. F.
<i>Opium, Camphorated Tincture of</i>	<i>Tinctura Opium Camphorata</i> , U. S. P.
<i>Opium, Compound Liniment of</i>	<i>Linimentum Opium Compositum</i> , N. F.
<i>Opium, Deodorized</i>	<i>Opium Deodoratum</i> , U. S. P.
<i>Opium, Extract of</i>	<i>Extractum Opium</i> , U. S. P.
<i>Opium, Granulated</i>	<i>Opium Granulatum</i> , U. S. P.
<i>Opium, Pills of (see Pills of Opium)</i> .	
<i>Opium Plaster</i>	<i>Emplastrum Hydrargyri</i> , U. S. P. VIII.
<i>Opium, Powdered</i>	<i>Opium Pulvis</i> , U. S. P.
<i>Opium, Tincture of</i>	<i>Tinctura Opium</i> , U. S. P.
<i>Opium, Tincture of Deodorized</i>	<i>Tinctura Opium Deodorati</i> , U. S. P.
<i>Opium, Vinegar of</i>	<i>Acetum Opium</i> , N. F.
<i>Opium, Wine of</i>	<i>Vinum Opium</i> , U. S. P. VIII.
<i>Opium with Saffron, Tincture of</i>	<i>Tinctura Opium Crocata</i> , N. F.
<i>Opodeldoc</i>	<i>Linimentum Saponato-Camphoratum</i> , N. F.
<i>Orange, Compound Spirit of</i>	<i>Spiritus Aurantii Compositus</i> , U. S. P.
<i>Orange, Compound Wine of</i>	<i>Vinum Aurantii Compositum</i> , N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Orange Flowers, Oil of.....	Oleum Aurantii Florum, N. F.
Orange Flowers, Syrup of.....	Syrupus Aurantii Florum, U. S. P.
Orange Flower Water.....	Aqua Aurantii Florum, U. S. P.
Orange Flower Water, Stronger.....	Aqua Aurantii Florum Fortior, U. S. P.
Orange Oil.....	Oleum Aurantii, U. S. P.
Orange Peel, Bitter.....	Aurantii Amari Cortex, U. S. P.
Orange Peel, Fluidextract of Bitter.....	Fluidextractum Aurantii Amari, U. S. P.
Orange Peel, Tincture of Bitter.....	Tinctura Aurantii Amari, U. S. P.
Orange Peel, Tincture of Sweet.....	Tinctura Aurantii Dulcis, U. S. P.
Orange Peel, Sweet.....	Aurantii Dulcis Cortex, U. S. P.
Orange, Spirit of.....	Spiritus Aurantii, N. F. III.
Orange, Syrup of.....	Syrupus Aurantii, U. S. P.
Ordeal Bean.....	Physostigma, U. S. P.
Oregon Grape Root.....	Berberis, N. F.
Orphol.....	Bismuthi Betanaphtholas, U. S. P.
Orris.....	Iris, N. F.
Orris Root.....	Iris, N. F.
Orthohydroxybenzoic Acid.....	Acidum Salicylicum, U. S. P.
Oxgall.....	Fel Bovis, U. S. P.
Oxgall, Extract of.....	Extractum Fellis Bovis, U. S. P.
Oxydum Calcicum.....	Calx, U. S. P.
Oxydum Hydrargyricum.....	Hydrargyri Oxidum Rubrum, U. S. P.
Oxydum Hydrargyricum Flavum.....	Hydrargyri Oxidum Flavum, U. S. P.
Oxydum Magnesicum Leve.....	Magnesii Oxidum, U. S. P.
Oxydum Magnesicum Ponderosum.....	Magnesii Oxidum Ponderosum, U. S. P.
Oxydum Plumbicum.....	Plumbi Oxidum, U. S. P.
Oxydum Zincicum.....	Zinci Oxidum, U. S. P.
Oxygen.....	Oxygenium, U. S. P.
Oxymel of Squill.....	Oxymel Scillæ, N. F.
Pale Catechu.....	Gambir, U. S. P.
Pancreatic Powder, Compound.....	Pulvis Pancreatini Compositus, N. F.
Pancreatic Solution.....	Liquor Pancreatini, N. F.
Pancreatin.....	Pancreatinum, U. S. P.
Pancreatin, Solution of.....	Liquor Pancreatini, N. F.
Paper, Cantharides.....	Charta Cantharidis, N. F. III.
Paper, Mustard.....	Emplastrum Sinapis, U. S. P.
Papoose Root.....	Caulophyllum, N. F.
Para-acetphenetidin.....	Acetphenetidinum, U. S. P.
Paracoto.....	Paracoto, N. F.
Paracoto, Fluidextract of.....	Fluidextractum Paracoto, N. F.
Paracoto, Tincture of.....	Tinctura Paracoto, N. F.
Paraffin.....	Paraffinum, U. S. P.
Paraffinum Liquidum.....	Petrolatum Liquidum, U. S. P.
Paraffinum Solidum.....	Paraffinum, U. S. P.
Paraform.....	Paraformaldehydum, U. S. P.
Paraformaldehyde.....	Paraformaldehydum, U. S. P.
Paraldehyde.....	Paraldehydum, U. S. P.
Paraldehyde, Elixir of.....	Elixir Paraldehydi, N. F. III.
Paragoric.....	Tinctura Opii Camphorata, U. S. P.
Pareira.....	Pareira, N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Pareira Brava.....	Pareira, N. F.
Pareira, Fluidextract of.....	Fluidextractum Pareiræ, N. F.
Parriah's Camphor Mixture.....	Mistura Camphoræ Aromatica, N. F.
Parsley Fruit.....	Petroselinum, U. S. P.
Parsley Fruit, Oleoresin of.....	Oleoresina Petroselini, U. S. P.
Parsley Root.....	Petroselini Radix, N. F.
Parsley Root, Fluidextract of.....	Fluidextractum Petroselini Radicis, N. F.
Pasque Flower.....	Pulsatilla, N. F.
Passion Flower.....	Passiflora, N. F.
Passion Flower, Tincture of.....	Tinctura Passifloræ, N. F.
Passion Vine.....	Passiflora, N. F.
Paste, Dextrinated.....	Pasta Dextrinata, N. F.
Pastes, Dermatologic.....	Pasta Dermatologica, N. F.
Paste, Lassar's Mild Resorcinol.....	Pasta Resorcinolis Mitis, N. F.
Paste, Lassar's Naphthol.....	Pasta Betanaphtholis, N. F.
Paste, Lassar's Stronger Resorcinol.....	Pasta Resorcinolis Fortis, N. F.
Paste, Lassar's Zinc.....	Pasta Zinci, N. F.
Paste, Mild Resorcinol.....	Paste Resorcinolis, Mitis, N. F.
Paste Pencils.....	Stili Dilubiles, N. F.
Paste, Unna's Ichthyol.....	Pasta Ichthyoli Unna, N. F. III.
Paste, Unna's Sulphurated Zinc.....	Pasta Zinci Sulphurata, N. F.
Paste, Soft Zinc.....	Pasta Zinci Mollis, N. F.
Pearson's Solution of Sodium Arsenate.....	Liquor Sodii Arsenatis, Pearson, N. F.
Pectoral Drops.....	Tinctura Pectoralis, N. F.
Pectoral Species.....	Species Pectorales, N. F.
Pectoral Tincture.....	Tinctura Pectoralis, N. F.
Peel, Bitter Orange.....	Aurantii Amari Cortex, U. S. P.
Peel, Sweet Orange.....	Aurantii Dulcis Cortex, U. S. P.
Pelletierine Tannate.....	Pelletierinæ Tannas, U. S. P.
Pellitory Root.....	Pyrethrum, U. S. P.
Pencil, Cocaine.....	Stilus Cocainæ Dilubilis, N. F. III.
Pencil, Salicylic Acid.....	Stilus Acidi Salicylici Dilubilis, N. F.
Pencils, Paste.....	Stili Dilubiles, N. F.
Pepo.....	Pepo, U. S. P.
Pepper.....	Piper, U. S. P.
Peppermint.....	Mentha Piperita, U. S. P.
Peppermint Oil.....	Oleum Menthæ Piperitæ, U. S. P.
Peppermint, Spirit of.....	Spiritus Menthæ Piperitæ, U. S. P.
Peppermint, Troches of.....	Trochisci Menthæ Piperitæ, N. F.
Peppermint Water.....	Aqua Menthæ Piperitæ, U. S. P.
Pepper, Oleoresin of.....	Oleoresina Piperis, U. S. P.
Pepsin.....	Pepsinum, U. S. P.
Pepsin and Bismuth, Elixir of.....	Elixir Pepsini et Bismuthi, N. F.
Pepsin and Iron, Elixir of.....	Elixir Pepsini et Ferri, N. F.
Pepsin and Rennin, Compound Elixir of.....	Elixir Pepsini et Rennini Compositum, N. F.
Pepsin, Antiseptic Solution of.....	Liquor Pepsini Antisepticus, N. F.
Pepsin, Aromatic.....	Pepsinum Aromaticum, N. F. III.
Pepsin, Aromatic Solution of.....	Liquor Pepsini Aromaticus, N. F.
Pepsin, Bismuth, and Strychnine, Elixir Pepsini, Bismuthi, et Strychninæ, Elixir of.....	N. F.
Pepsin, Compound Powder of.....	Pulvis Pepsini Compositus, N. F. III.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Pepsin, Elixir of.....	Elixir Pepsini, N. F.
Pepsin, Glycerite of.....	Glyceritum Pepsinum, N. F.
Pepsin, Lime Juice and.....	Succus Citri et Pepsinum, N. F.
Pepsin, Saccharated.....	Pepsinum Saccharatum, N. F.
Pepsin, Solution of.....	Liquor Pepsini, N. F.
Pepsin, Wine of.....	Vinum Pepsini, N. F.
Peptonate of Iron and Manganese. So- lution of.	Liquor Ferri Peptonati et Mangano, N. F.
Peptonate of Iron, Solution of.....	Liquor Ferri Peptonati, N. F.
Peptonizing Powder.....	Pulvis Pancreatini Compositus, N. F.
Perchloride of Mercury.....	Hydrargyri Chloridum Corrosivum, U. S. P.
Perfumed Spirit.....	Spiritus Odoratus, N. F.
Peru, Balsam of.....	Balsamum Peruvianum, U. S. P.
Petrolatum.....	Petrolatum, U. S. P.
Petrolatum Emulsum of.....	Emulsum Petrolati, N. F.
Petrolatum, Liquid.....	Petrolatum Liquidum, U. S. P.
Petrolatum Ointment.....	Petrolatum, U. S. P.
Petrolatum Saponatum Liquidum, Petroxolinum Liquidum, N. F. N. F. III.	
Petrolatum, White.....	Petrolatum Album, U. S. P.
Petroleum Benzin.....	Benzinum, U. S. P. VIII.
Petroleum Benzin, Purified.....	Benzinum Purificatum, U. S. P.
Petroleum Ether.....	Benzinum Purificatum, U. S. P.
Petroleum Jelly.....	Petrolatum, U. S. P.
Petroselinum.....	Petroselinum, U. S. P.
Petroxolin, Betanaphthol.....	Petroxolinum Betanaphtholis, N. F.
Petroxolin, Cade.....	Petroxolinum Cadini, N. F.
Petroxolin, Camphorated Chloroform....	Petroxolinum Chloroformi Camphoratum, N. F.
Petroxolin, Camphorated Phenol.....	Petroxolinum Phenolis Camphoratum, N. F.
Petroxolin, Compound Sulphurated.....	Petroxolinum Sulphurata Compositum, N. F.
Petroxolin, Creosote.....	Petroxolinum Creosoti, N. F.
Petroxolin, Diluted Iodine.....	Petroxolinum Iodi Dilutum, N. F.
Petroxolin, Eucalyptol.....	Petroxolinum Eucalyptolis, N. F.
Petroxolin, Guaiacol.....	Petroxolinum Guaiacolis, N. F.
Petroxolin, Iodine.....	Petroxolinum Iodi, N. F.
Petroxolin, Iodoform.....	Petroxolinum Iodoformi, N. F.
Petroxolin, Liquid.....	Petroxolinum Liquidum, N. F.
Petroxolin, Menthol.....	Petroxolinum Mentholis, N. F.
Petroxolin, Mercury.....	Petroxolinum Hydrargyri, N. F.
Petroxolin, Methyl Salicylate.....	Petroxolinum Methylis Salicylatis, N. F.
Petroxolin, Phenol.....	Petroxolinum Phenolis, N. F.
Petroxolin, Solid.....	Petroxolinum Spissum, N. F.
Petroxolin, Sulphurated.....	Petroxolinum Sulphurata, N. F.
Petroxolin, Tar.....	Petroxolinum Picis, N. F.
Petroxolin, Venice Turpentine.....	Petroxolinum Terebinthinæ Laricis, N. F.
Pheasant's Eye.....	Adonis, N. F.
Phenacetin.....	Acetphenetidinum, U. S. P.
Phenacetinum.....	Acetphenetidinum, U. S. P.
Phenol.....	Phenol, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Phenolated Oil</i>	<i>Oleum Phenolatum</i> , N. F.
<i>Phenolated Solution of Iodine</i>	<i>Liquor Iodi Phenolatus</i> , N. F.
<i>Phenolated Water</i>	<i>Aqua Phenolata</i> , N. F.
<i>Phenol, Glycerite of</i>	<i>Glyceritum Phenolis</i> , U. S. P.
<i>Phenol, Iodized</i>	<i>Phenolum Iodatum</i> , N. F.
<i>Phenoli, Solutio P. I.</i>	<i>Aqua Phenolata</i> , N. F.
<i>Phenol, Liquefied</i>	<i>Phenol Liquefactum</i> , U. S. P.
<i>Phenol, Ointment of</i>	<i>Unguentum Phenolis</i> , U. S. P.
<i>Phenol Petrox.</i>	<i>Petroxolinum Phenolis</i> , N. F.
<i>Phenol Petrozolin</i>	<i>Petroxolinum Phenolis</i> , N. F.
<i>Phenolphthalein</i>	<i>Phenolphthaleinum</i> , U. S. P.
<i>Phenolphthalein, Troches of</i>	<i>Trochisci Phenolphthaleini</i> , N. F.
<i>Phenylacetamide</i>	<i>Acetanilidum</i> , U. S. P.
<i>Phenylcinchonic Acid</i>	<i>Acidum Phenylcinchonicum</i> , U. S. P.
<i>Phenyl-quinoline-carboxylic Acid</i>	<i>Acidum Phenylcinchonicum</i> , U. S. P.
<i>Phenyl Salicylate</i>	<i>Phenylis Salicylas</i> , U. S. P.
<i>Phosphas Codeicus</i>	<i>Codeinæ Phosphas</i> , U. S. P.
<i>Phosphas Natricus</i>	<i>Sodii Phosphas</i> , U. S. P.
<i>Phosphates, Acid Solution of</i>	<i>Liquor Phosphatum Acidus</i> , N. F.
<i>Phosphates, Compound Syrup of</i>	<i>Syrupus Phosphatum Compositus</i> , N. F.
<i>Phosphates, Compound Solution of</i>	<i>Liquor Phosphatum Compositus</i> , N. F.
<i>Phosphates with Quinine and Strychnine, Syrup of</i>	<i>Syrupus Phosphatum cum Quinina et Strychnina</i> , N. F.
<i>Phosphatic Emulsion</i>	<i>Emulsum Phosphaticum</i> , N. F. III.
<i>Phosphorated Oil</i>	<i>Oleum Phosphoratum</i> , N. F.
<i>Phosphoric Acid</i>	<i>Acidum Phosphoricum</i> , U. S. P.
<i>Phosphoric Acid, Diluted</i>	<i>Acidum Phosphoricum Dilutum</i> , U. S. P.
<i>Phosphorus</i>	<i>Phosphorus</i> , U. S. P.
<i>Phosphorus and Nux Vomica, Elixir of</i>	<i>Elixir Phosphori et Nucis Vomice</i> , N. F.
<i>Phosphorus, Elixir of</i>	<i>Elixir Phosphori</i> , N. F.
<i>Phosphorus, Pills of</i>	<i>Pilulæ Phospori</i> , U. S. P.
<i>Phosphorus, Solution of</i>	<i>Liquor Phosphori</i> , N. F.
<i>Phosphorus, Spirit of</i>	<i>Spiritus Phosphori</i> , N. F. III.
<i>Physiological Salt Solution</i>	<i>Liquor Sodii Chloridi Physiologicus</i> , U. S. P.
<i>Physiological Solution of Sodium Chloride</i>	<i>Liquor Sodii Chloridi Physiologicus</i> , U. S. P.
<i>Physol</i>	<i>Liquor Pepsini Antisepticus</i> , N. F.
<i>Physostigma</i>	<i>Physostigma</i> , U. S. P.
<i>Physostigma, Extract of</i>	<i>Extractum Physostigmatis</i> , U. S. P.
<i>Physostigma, Tincture of</i>	<i>Tinctura Physostigmatis</i> , U. S. P.
<i>Physostigmine Salicylate</i>	<i>Physostigminæ Salicylas</i> , U. S. P.
<i>Physostigmine Sulphate</i>	<i>Physostigminæ Sulphas</i> , U. S. P. VIII.
<i>Physostigminum Salicylicum</i>	<i>Physostigminæ Salicylas</i> , U. S. P.
<i>Phytolacca</i>	<i>Phytolacca</i> , N. F.
<i>Phytolacca, Fluidextract of</i>	<i>Fluidextractum Phytolacæ</i> , N. F.
<i>Picric Acid</i>	<i>Trinitrophenol</i> , U. S. P.
<i>Pill Bearing Spurge</i>	<i>Euphorbia Pilulifera</i> , N. F.
<i>Pills</i>	<i>Pilulæ</i> , N. F.
<i>Pills, Antidyspeptic</i>	<i>Pilulæ Antidyspeptice</i> , N. F.
<i>Pills, Antiperiodic</i>	<i>Pilulæ Antiperiodicæ</i> , N. F.
<i>Pills, Antiperiodic Without Aloe</i>	<i>Pilulæ Antiperiodicæ sine Aloe</i> , N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Pills, Compound Cathartic.....	Pilulæ Catharticæ Compositæ, U. S. P.
Pills, Compound Laxative.....	Pilulæ Laxativæ Compositæ, N. F.
Pills, Laxative, After Confinement.....	Pilulæ Laxativæ Post Partum, N. F.
<i>Pills of Aloes</i>	Pilulæ Aloes, U. S. P.
<i>Pills of Aloes and Asafetida</i>	Pilulæ Aloes et Asafœtidæ, N. F.
<i>Pills of Aloes and Iron</i>	Pilulæ Aloes et Ferri, N. F.
<i>Pills of Aloes and Mastic</i>	Pilulæ Aloes et Mastiches, N. F.
<i>Pills of Aloes and Myrrh</i>	Pilulæ Aloes et Myrrhæ, N. F.
Pills of Aloes and Podophyllum, Com- pound.	Pilulæ Aloes et Podophylli Compositæ, N. F.
<i>Pills of Aloes, Mercury and Podophyllum</i>	Pilulæ Aloes, Hydrargyri et Podophylli, N. F.
Pills of Aloes, Mercury and Scammony, Compound.	Pilulæ Aloes, Hydrargyri et Scammonii Compositæ, N. F.
Pills of Aloin, Compound.....	Pilulæ Aloini Compositæ, N. F.
<i>Pills of Aloin, Strychnine and Belladonna</i>	Pilulæ Aloini Strychninæ et Belladonnæ, N. F.
Pills of Aloin, Strychnine and Bella- donna, Compound.	Pilulæ Aloini, Strychninæ et Belladonnæ Compositæ, N. F.
Pills of Antimony, Compound.....	Pilulæ Antimonii Compositæ, N. F.
<i>Pills of Asafetida</i>	Pilulæ Asafœtidæ, U. S. P.
<i>Pills of Coccia</i>	Pilulæ Colocynthis Compositæ, N. F.
<i>Pills of Colocynth and Hyoscyamus</i>	Pilulæ Colocynthis et Hyoscyami, N. F.
<i>Pills of Colocynth and Podophyllum</i>	Pilulæ Colocynthis et Podophylli, N. F.
Pills of Colocynth, Compound.....	Pilulæ Colocynthis Compositæ, N. F.
<i>Pills of Digitalis, Squill and Mercury</i>	Pilulæ Digitalis, Scillæ et Hydrargyri, N. F.
<i>Pills of Ferrous Carbonate</i>	Pilulæ Ferri Carbonatis, U. S. P.
<i>Pills of Ferrous Iodide</i>	Pilulæ Ferri Iodidi, U. S. P.
Pills of Galbanum Compound.....	Pilulæ Galbani Compositæ, N. F. III.
Pills of Glonoin.....	Pilulæ Glycerylis Nitratis, N. F.
Pills of Iron, Compound.....	Pilulæ Ferri Compositæ, N. F. III.
<i>Pills of Iron, Quinine, Aloes and Nux Vomica</i>	Pilulæ Ferri, Quininæ, Aloes et Nucis Vomicæ, N. F.
Pills of Iron, Quinine, Strychnine and Arsenic, Mild.	Pilulæ Ferri, Quininæ, Strychninæ Arseni Mitis, N. F.
Pills of Iron, Quinine, Strychnine and Arsenic, Stronger.	Pilulæ Ferri, Quininæ, Strychninæ Arseni, Fortiores, N. F.
<i>Pills of Nitroglycerin</i>	Pilulæ Glycerylis Nitratis, N. F.
<i>Pills of Opium</i>	Pilulæ Opii, U. S. P. VIII.
<i>Pills of Opium and Camphor</i>	Pilulæ Opii et Camphoræ, N. F.
<i>Pills of Opium and Lead</i>	Pilulæ Opii et Plumbi, N. F.
<i>Pills of Opium, Digitalis and Quinine</i>	Pilulæ Opii, Digitalis, et Quininæ, N. F.
<i>Pills of Phosphorus</i>	Pilulæ Phosphori, U. S. P.
<i>Pills of Podophyllum, Belladonna and Capsicum</i>	Pilulæ Podophylli, Belladonnæ et Capsici, U. S. P. VIII.
<i>Pills of Rhubarb</i>	Pilulæ Rhei, N. F.
Pills of Rhubarb, Compound.....	Pilulæ Rhei Compositæ, U. S. P.
Pills, Vegetable Cathartic.....	Pilulæ Catharticæ, Vegetabilis, N. F.
<i>Pilocarpus</i>	Pilocarpus, U. S. P.
Pilocarpus, Elixir of.....	Elixir Pilocarpi, N. F.
Pilocarpis, Fluidextract of.....	Fluidextractum Pilocarpus, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Pilocarpine Chloride.....	Pilocarpinæ Hydrochloridum, U. S. P.
<i>Pilocarpine Hydrochloride</i>	Pilocarpinæ Hydrochloridum, U. S. P.
<i>Pilocarpine Nitrate</i>	Pilocarpinæ Nitras, U. S. P.
Pilocarpinum Hydrochloricum.....	Pilocarpinæ Hydrochloridum, U. S. P.
Pilulæ Ferri Carbonici.....	Pilulæ Ferri Carbonatis, U. S. P.
Pilulæ Ferri et Quininæ Compositæ.....	Pilulæ Ferri, Quininæ, Aloes, et Nucis Vomicae, N. F.
Pilulæ Ferri Jodati.....	Pilulæ Ferri Iodidi, U. S. P.
Pilulæ Glonoini, N. F. III.....	Pilulæ Glycerylis Nitratis, N. F.
Pilulæ Jodeti Ferrosi.....	Pilulæ Ferri Iodidi, U. S. P.
Pilulæ Metallorum Amarae.....	Pilulæ Ferri, Quininæ, Strychninæ et Arseni Fortiores, N. F.
Pilulæ Quadruplices, N. F. III.....	Pilulæ Ferri, Quininæ, Aloes, et Nucis Vomicae, N. F.
Pilulæ Triplices, N. F. III.....	Pilulæ Aloes Hydrargyri et Podophylli, N. F.
Pilulæ Triplex.....	Pilulæ Aloes Hydrargyri et Podophylli, N. F.
<i>Pimenta</i>	Pimenta, N. F.
<i>Pimento</i>	Pimenta, N. F.
<i>Pimenta Oil</i>	Oleum Pimentæ, U. S. P.
<i>Pimpernel Root</i>	Pimpinella, N. F.
<i>Pimpinella</i>	Pimpinella, N. F.
<i>Pimpinella, Tincture of</i>	Tinctura Pimpinellæ, N. F.
<i>Pine Tar</i>	Pix Liquida, U. S. P.
<i>Pinkroot</i>	Spigelia, U. S. P.
<i>Piperine</i>	Piperina, U. S. P. VIII.
<i>Pipessewa</i>	Chimaphila, N. F.
<i>Pipe Gamboge</i>	Cambogia, U. S. P.
<i>Pituitary Body, Desiccated</i>	Hypophysis Sicca, U. S. P.
<i>Pituitary Body, Solution of</i>	Liquor Hypophysis, U. S. P.
<i>Pix Carbonis</i>	Pix Lithanthracis, N. F.
<i>Pix Pini</i>	Pix Liquida, U. S. P.
<i>Plaster</i>	Emplastrum (which see).
<i>Plaster, Ammoniac</i>	Emplastrum Ammoniaci, N. F. III.
<i>Plaster, Arnica</i>	Emplastrum Arnicæ, N. F. III.
<i>Plaster, Belladonna</i>	Emplastrum Belladonnæ, U. S. P.
<i>Plaster, Capsicum</i>	Emplastrum Capsici, U. S. P.
<i>Plaster, Cantharides</i>	Emplastrum Cantharidis, U. S. P.
<i>Plaster, Lead</i>	Emplastrum Plumbi, U. S. P.
<i>Plaster, Mercurial</i>	Emplastrum Hydrargyri, U. S. P. III.
<i>Plaster, Mustard</i>	Emplastrum Sinapis, U. S. P.
<i>Plaster, Opium</i>	Emplastrum Opii, U. S. P. VIII.
<i>Plaster, Rosin</i>	Emplastrum Resinæ, U. S. P.
<i>Plaster, Rubber</i>	Emplastrum Elasticum, U. S. P.
<i>Plaster with Mercury, Ammoniac</i>	Emplastrum Ammoniaci cum Hydrargyro, N. F. III.
<i>Pleurisy Root</i>	Asclepias, N. F.
<i>Plumbum Aceticum</i>	Plumbi Acetas, U. S. P.
<i>Plumbum Subaceticum Solutum</i>	Liquor Plumbi Subacetatis, U. S. P.
<i>Plumbum Oxidatum</i>	Plumbi Oxidum, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Plummer's Pills.....	Pilulæ Antimonii Compositæ, N. F.
Podophyllinum.....	Resina Podophylli, U. S. P.
<i>Podophyllum</i>	Podophyllum, U. S. P.
Podophyllum, Belladonna and Capsicum, Pills of.....	Pilulæ Podophylli, Belladonnæ et Capsici, U. S. P. VIII.
Podophyllum, Extract of.....	Extractum Podophylli, N. F.
Podophyllum, Fluidextract of.....	Fluidextractum Podophylli, U. S. P.
Podophyllum, Resin of.....	Resina Podophylli, U. S. P.
Poison Hemlock.....	Conium, N. F.
<i>Poison Tablets of Corrosive Mercuric Chloride</i>	Toxitebellæ Hydrargyri Chloridi, Corrosivi, U. S. P.
Poke Root.....	Phytolacca, N. F.
Pomegranate.....	Granatum, U. S. P.
Pomegranate Bark.....	Granatum, U. S. P.
Pomegranate, Fluidextract of.....	Fluidextractum Granati, U. S. P.
<i>Poppy Capsules</i>	Papaveris Fructus, N. F.
Poppy Capsules, Syrup of.....	Syrupus Papaveris, N. F.
Poppy, Tincture of.....	Tinctura Papaveris, N. F. III.
Potassa, Chlorinated, Solution of.....	Liquor Potassæ Chlorinatæ, N. F.
Potassa, Sulphurated.....	Potassa Sulphurata, U. S. P.
<i>Potassa with Lime</i>	Potassa cum Calce, N. F.
<i>Potassium Acetate</i>	Potassii Acetas, U. S. P.
Potassium Acetate, Elixir of.....	Elixir Potassii Acetatis, N. F.
Potassium Acetate and Juniper, Elixir of.....	Elixir Potassii Acetatis et Juniperi, N. F.
<i>Potassium and Sodium Tartrate</i>	Potassii et Sodii Tartras, U. S. P.
Potassium Arsenate and Bromide, Solution of.....	Liquor Potassii Arsenatis et Bromidi, N. F. III.
Potassium Arsenite, Solution of.....	Liquor Potassii Arsenatis, U. S. P.
<i>Potassium Bicarbonate</i>	Potassii Bicarbonas, U. S. P.
<i>Potassium Bitartrate</i>	Potassii Bitartras, U. S. P.
<i>Potassium Bromide</i>	Potassii Bromidum, U. S. P.
Potassium Bromide, Compound Effervescent Salt of.....	Sal Potassii Bromidi Effervescens Compositus, N. F.
Potassium Bromide, Effervescent Salt of.....	Sal Potassii Bromidi Effervescens, N. F.
<i>Potassium Bromide, Elixir of</i>	Elixir Potassii Bromidi, N. F.
<i>Potassium Carbonate</i>	Potassii Carbonas, U. S. P.
<i>Potassium Chlorate</i>	Potassii Chloras, U. S. P.
Potassium Chlorate, Troches of.....	Trochisci Potassii Chloratis, U. S. P.
<i>Potassium Chloride</i>	Potassii Chloridum, N. F.
<i>Potassium Citrate</i>	Potassii Citras, U. S. P.
Potassium Citrate, Effervescent.....	Potassii Citras Effervescens, U. S. P.
<i>Potassium Cyanide</i>	Potassii Cyanidum, U. S. P. VIII.
<i>Potassium Dichromate</i>	Potassii Dichromas, U. S. P. VIII.
<i>Potassium Ferrocyanide</i>	Potassii Ferrocyanidum, U. S. P. VIII.
Potassium Hydrate.....	Potassii Hydroxidum, U. S. P.
<i>Potassium Hydroxide</i>	Potassii Hydroxideum, U. S. P.
Potassium Hydroxide, Solution of.....	Liquor Potassii Hydroxidi, U. S. P.
<i>Potassium Hypophosphite</i>	Potassii Hypophosphia, U. S. P.
<i>Potassium Iodide</i>	Potassii Iodidum, U. S. P.
Potassium Iodide, Ointment of.....	Unguentum Potassii Iodidi, N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Potassium Nitrate</i>	Potassii Nitræ, U. S. P.
<i>Potassium Nitrate Paper</i>	Charta Potassii Nitratis, N. F.
<i>Potassium Permanganate</i>	Potassii Permanganas, U. S. P.
<i>Potassium Sulphate</i>	Potassii Sulphas, N. F.
<i>Powder, Antimonial</i>	Pulvis Antimonialis, N. F.
<i>Powder, Aromatic</i>	Pulvis Aromaticus, U. S. P.
<i>Powder, Catarrh</i>	Pulvis Anticatrarrhalis, N. F. III.
<i>Powder, Compound Acetanilid</i>	Pulvis Acetanilidi, Compositus, N. F.
<i>Powder, Compound Chalk</i>	Pulvis Cretæ Compositus, U. S. P.
<i>Powder, Compound Effervescent</i>	Pulvis Effervescens Compositus, U. S. P.
<i>Powder, Compound Pancreatic</i>	Pulvis Pancreatini Compositus, N. F.
<i>Powdered Compound Extract of Colocynth</i>	Extractum Colocynthidis Compositum, U. S. P.
<i>Powdered Extract of Aconite</i>	Extractum Aconiti, U. S. P.
<i>Powdered Extract of Cascara Sagrada</i>	Extractum Cascaræ Sagradæ, U. S. P.
<i>Powdered Extract of Cimicifuga</i>	Extractum Cimicifugæ, U. S. P.
<i>Powdered Extract of Colchicum Corm</i>	Extractum Colchici Cormi, U. S. P.
<i>Powdered Extract of Colocynth</i>	Extractum Colocynthidis, U. S. P.
<i>Powdered Extract of Gelsemium</i>	Extractum Gelsemii, U. S. P.
<i>Powdered Extract of Hydrastis</i>	Extractum Hydrastis, U. S. P.
<i>Powdered Extract of Leplandna</i>	Extractum Leplandree, N. F.
<i>Powdered Extract of Nux Vomica</i>	Extractum Nucis Vomice, U. S. P.
<i>Powdered Extract of Opium</i>	Extractum Opii, U. S. P.
<i>Powdered Extract of Oxgall</i>	Extractum Fellis Bovis, U. S. P.
<i>Powdered Extract of Physostigma</i>	Extractum Physostigmatis, U. S. P.
<i>Powdered Extract of Rhubarb</i>	Extractum Rhei, U. S. P.
<i>Powdered Extract of Viburnum Prunifolium</i>	Extractum Viburni Prunifolii, U. S. P.
<i>Powdered Opium</i>	Opii Pulvis, U. S. P.
<i>Powder, Humanizing Milk</i>	Pulvis Pro Lacte Humanisato, N. F. III.
<i>Powder of Acacia, Compound</i>	Pulvis Acaciæ Compositus, N. F. III.
<i>Powder of Almond, Compound</i>	Pulvis Amygdalæ Compositus, N. F. III.
<i>Powder of Aloe and Canella</i>	Pulvis Aloes et Canellæ, N. F.
<i>Powder of Bayberry, Compound</i>	Pulvis Myricæ Compositus, N. F.
<i>Powder of Chalk, Aromatic</i>	Pulvis Cretæ Aromaticus, N. F.
<i>Powder of Chalk with Opium, Aromatic</i>	Pulvis Cretæ Aromaticus et Opii, N. F.
<i>Powder of Citrate of Iron and Quinine</i>	Pulvis Ferri et Quininae Citratis Effervescens, N. F. III.
<i>Powder of Ferric Phosphate, Effervescent</i>	Pulvis Ferri Phosphatis Effervescens N. F. III.
<i>Powder of Gambir, Compound</i>	Pulvis Gambir Compositus, N. F.
<i>Powder of Glycyrrhiza, Compound</i>	Pulvis Glycyrrhizæ Compositus, U. S. P.
<i>Powder of Iodoform, Compound</i>	Pulvis Iodoformi Compositus, N. F. III.
<i>Powder of Ipecac and Opium</i>	Pulvis Ipecacuanhæ et Opii, U. S. P.
<i>Powder of Jalap, Compound</i>	Pulvis Jalapæ Compositus, U. S. P.
<i>Powder of Kino and Opium, Compound</i>	Pulvis Kino et Opii Compositus, N. F.
<i>Powder of Mild Mercurous Chloride and Jalap</i>	Pulvis Hydrargyri Chloridi Mitis, et Jalapæ, N. F.
<i>Powder of Pepsin, Compound</i>	Pulvis Pepsini Compositus, N. F. III.
<i>Powder of Rhubarb and Magnesia, Anisated</i>	Pulvis Rhei et Magnesiæ Anisatus, N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Powder of Rhubarb, Compound.....	Pulvis Rhei Compositus, U. S. P.
Powder of Talc.....	Pulvis Talci Compositus, N. F.
Powder, Rubefacient Spice.....	Pulvis Aromaticus Rubefaciens, N. F.
Powder, Soluble Antiseptic.....	Pulvis Antisepticus, N. F.
Precipitated Chalk.....	Calcii Carbonas Præcipitatus, U. S. P.
Precipitated Calcium Carbonate.....	Calcii Carbonas Præcipitatus, U. S. P.
Precipitated Calcium Phosphate.....	Calcii Phosphas Præcipitatus, N. F.
Precipitated Ferrous Sulphate.....	Ferri Sulphas Granulatus, U. S. P.
Precipitated Manganese Dioxide.....	Mangani Dioxidum Præcipitatum, U. S. P.
Precipitated Sulphur.....	Sulphur Præcipitatum, U. S. P.
Precipitated Zinc Carbonate.....	Zinci Carbonas Præcipitatus, U. S. P.
Prepared Cacao.....	Cacao Præparata, N. F.
Prepared Calamine.....	Calamina Præparata, N. F.
Prepared Chalk.....	Creta Præparata, U. S. P.
Prepared Suet.....	Sevum Præparatum, U. S. P.
Prickly Ash Bark.....	Xanthoxylum, U. S. P.
Prickly Ash Berries.....	Xanthoxylum Fructus, N. F.
Protochloride of Iron, Solution of.....	Liquor Ferri Protochloridi, N. F.
Protochloride of Mercury.....	Hydrargyri Chloridum Mite, U. S. P.
Protoiodide of Mercury.....	Hydrargyri Iodidum Flavum, U. S. P.
Prune.....	Prunum, N. F.
Prussic Acid.....	Acidum Hydrocyanicum Dilutum, U. S. P.
Pulsatilla.....	Pulsatilla, N. F.
Pulsatilla, tincture of.....	Tincture Pulsatillæ, N. F.
Pulvis Aerophorus Laxans.....	Pulvis Effervescens Compositus, U. S. P.
Pulvis Antisepticus Solubilis.....	Pulvis Antisepticus, N. F.
Pulvis Catechu Compositus, N. F. III.....	Pulvis Gambir Compositus, N. F.
Pulvis Digestivus.....	Pulvis Pepsini Compositus, N. F. III.
Pulvis Ipecacuanhæ Opiatus.....	Pulvis Ipecacuanhæ et Opii, U. S. P.
Pulvis Kino Compositus, N. F. III.....	Pulvis Kino et Opii, Compositus, U. S. P.
Pulvis Liquiritiæ Compositus.....	Pulvis Glycyrrhizæ Compositus, U. S. P.
Pulvis Opii, P. I.....	Opii Pulvis, U. S. P.
Pulvis Purgans.....	Pulvis Jalapæ Compositus, U. S. P.
Pumice.....	Pumex, N. F.
Pumpkin Seed.....	Pepo, U. S. P.
Pure Extract of Glycyrrhiza.....	Extractum Glycyrrhizæ Purum, U. S. P.
Purified Aloe.....	Aloe Purificata, U. S. P. VIII.
Purified Animal Charcoal.....	Carbo Animalis Purificatus, U. S. P. VIII.
Purified Antidiphtheric Serum.....	Serum Antidiphthericum Purificatum, U. S. P.
Purified Antimony Sulphide.....	Antimonii Sulphidum Purificatum, N. F. III.
Purified Antimony Trisulphide.....	Antimonii Sulphidum Purificatum, N. F. III.
Purified Antitetanic Serum.....	Serum Antitetanicum Purificatum, U. S. P.
Purified Cotton.....	Gossypium Purificatum, U. S. P.
Purified Extract of Glycyrrhiza.....	Extractum Glycyrrhizæ Depuratum, N. F. III.
Purified Kisselguhr.....	Terra Silicea Purificata, U. S. P.
Purified Petroleum Benzin.....	Benzinum Purificatum, U. S. P.
Purified Siliceous Earth.....	Terra Silicea Purificata, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Purified Talc</i>	Talcum Purificatum, U. S. P.
<i>Pyrazolonum Phenylidimethylicum</i>	Antipyrina, U. S. P.
<i>Pyrethrom</i>	Pyrethrum, U. S. P.
<i>Pyrethrum, Tincture of</i>	Tinctura Pyrethri, U. S. P.
<i>Pyrogallic Acid</i>	Pyrogallol, U. S. P.
<i>Pyrogallol</i>	Pyrogallol, U. S. P.
<i>Pyrogallohum</i>	Pyrogallol, U. S. P.
<i>Pyrophosphate of Iron, Quinine and Strychnine, Elixir of</i>	Elixir Ferri Pyrophosphatis Quininæ et Strychninæ, N. F.
<i>Pyroxylin</i>	Pyroxylinum, U. S. P.
<i>Quadruplex Pills</i>	Pilulæ Ferri, Quininæ, Aloes et Nucis Vomiceæ, N. F.
<i>Quaker Black Drop</i>	Acetum Opii, N. F.
<i>Quassia</i>	Quassia, U. S. P.
<i>Quassia, Extract of</i>	Extractum Quassiae, N. F.
<i>Quassia, Fluid extract of</i>	Fluidextractum Quassiae, N. F.
<i>Quassia, Tincture of</i>	Tinctura Quassiae, U. S. P.
<i>Quator Pills</i>	Pilulæ Ferri, Quininæ, Aloes et Nucis Vomiceæ, N. F.
<i>Quebracho</i>	Aspidosperma, U. S. P.
<i>Queen's Delight</i>	Stillingia, U. S. P.
<i>Queen's Root</i>	Stillingia, U. S. P.
<i>Quercus, Fluid extract of</i>	Fluidextractum Quercus, N. F.
<i>Quevenne's Iron</i>	Ferrum Reductum, U. S. P.
<i>Quicklime</i>	Calx, U. S. P.
<i>Quicksilver</i>	Hydrargyrum, U. S. P.
<i>Quillaja</i>	Quillaja, N. F.
<i>Quillaja, Fluid extract of</i>	Fluid extractum Quillajæ, U. S. P. VIII.
<i>Quillaja, Tincture of</i>	Tinctura Quillajæ, N. F.
<i>Quinidine</i>	Quinidinæ, N. F.
<i>Quinidine, Syrup of</i>	Syrupus Quinidinæ, N. F.
<i>Quinine</i>	Quinina, U. S. P.
<i>Quinine and Phosphates, Compound Elixir of</i>	Elixir Quininæ et Phosphatum Compositum, N. F. III.
<i>Quinine and Urea Chloride</i>	Quininæ et Ureæ Hydrochloridum, U. S. P.
<i>Quinine and Urea Hydrochloride</i>	Quininæ et Ureæ Hydrochloridum, U. S. P.
<i>Quinine Bisulphate</i>	Quininæ Bisulphas, U. S. P.
<i>Quinine Bromide</i>	Quininæ Hydrobromidum, U. S. P.
<i>Quinine Chloride</i>	Quininæ Hydrochloridum, U. S. P.
<i>Quinine Dihydrochloride</i>	Quininæ Dihydrochloridum, U. S. P.
<i>Quinine Glycerinophosphate</i>	Quininæ Glycerophosphas, N. F.
<i>Quinine Glycerophosphate</i>	Quininæ Glycerophosphas, N. F.
<i>Quinine Hydrobromide</i>	Quininæ Hydrobromidum, U. S. P.
<i>Quinine Hydrochloride</i>	Quininæ Hydrochloridum, U. S. P.
<i>Quinine Hypophosphite</i>	Quininæ Hyphosphophis.
<i>Quinine, Oleate of</i>	Oleatum, Quininæ, N. F.
<i>Quinine Salicylate</i>	Quininæ Salicylas, U. S. P.
<i>Quinine Sulphate</i>	Quininæ Sulphas, U. S. P.
<i>Quinine Tannate</i>	Quininæ Tannas, U. S. P.
<i>Quinine Tannate, Troches of</i>	Trochisci Quininæ Tannatis, N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Quinine Valerate</i>	Quininæ Valeras, N. F.
<i>Quinine Valerate and Strychnine Elixir of</i>	Elixir Quininæ Valeratis et Strychninæ N. F.
<i>Quinidine</i>	Quinidinæ, N. F.
<i>Quinidine, Syrup of</i>	Syrupus Quinidinæ, N. F.
<i>Radix Althæae</i>	Althæa, U. S. P.
<i>Radix Colombo</i>	Calumba, U. S. P.
<i>Radix Gentianæ</i>	Gentiana, U. S. P.
<i>Radix Glycyrrhizæ</i>	Glycyrrhiza, U. S. P.
<i>Radix Liquiritiæ</i>	Glycyrrhiza, U. S. P.
<i>Radix Rathanhiæ</i>	Krameria, U. S. P.
<i>Radix Sarsaparillæ</i>	Sarsaparilla, U. S. P.
<i>Radix Senegæ</i>	Senega, U. S. P.
<i>Radix Taraxaci</i>	Taraxacum, U. S. P.
<i>Raspberry, Syrup of</i>	Syrupus Rubi Idæi, N. F.
<i>Raw Linseed Oil</i>	Oleum Lini, U. S. P.
<i>Rectified Empyroligneous Oil of Birch</i>	Oleum Betulæ Empyreumaticum Rectificatum, N. F.
<i>Rectified Oil of Birch Tar</i>	Oleum Betulæ Empyreumaticum Rectificatum, N. F.
<i>Rectified Oil of Tar</i>	Oleum Picis Liquidæ Rectificatum, U. S. P.
<i>Rectified Oil of Turpentine</i>	Oleum Terebinthinæ Rectificatum, U. S. P.
<i>Rectified Tar Oil</i>	Oleum Picis Liquidæ Rectificatum, U. S. P.
<i>Rectified Turpentine Oil</i>	Oleum Terebinthinæ Rectificatum, U. S. P.
<i>Red Aromatic Elixir</i>	Elixir Aromaticum Rubrum, N. F.
<i>Red Cinchona</i>	Cinchona Rubra, U. S. P.
<i>Red Clover Blossoms</i>	Trifolium, N. F.
<i>Red Elixir</i>	Elixir Aromaticum Rubrum, N. F.
<i>Red Indigo</i>	Persio, N. F.
<i>Red Iodide of Mercury</i>	Hydrargyri Iodidum Rubrum, U. S. P.
<i>Red Lead</i>	Plumbi Oxidum Rubrum, N. F.
<i>Red Mercuric Iodide</i>	Hydrargyri Iodidum Rubrum, U. S. P.
<i>Red Mercuric Oxide</i>	Hydrargyri Oxidum Rubrum, U. S. P.
<i>Red Mercuric Oxide, Ointment of</i>	Unguentum Hydrargyri Oxidi Rubri, N. F.
<i>Red Oxide of Lead</i>	Plumbi Oxidum Rubrum, N. F.
<i>Red Peruvian Bark</i>	Cinchona Rubra, U. S. P.
<i>Red Precipitate</i>	Hydrargyri Oxidum Rubrum, U. S. P.
<i>Red Rose</i>	Rosa Gallica, U. S. P.
<i>Red Saunders</i>	Santalum Rubrum, U. S. P.
<i>Reduced Iron</i>	Ferrum Reductum, U. S. P.
<i>Red Wine</i>	Vinum Rubrum, U. S. P. VIII.
<i>Refined and Concentrated Diphtheria Antitoxin</i>	Serum Antidiphthericum Purificatum, U. S. P.
<i>Refined and Concentrated Tetanus Antitoxin</i>	Serum Antitetanicum Purificatum, U. S. P.
<i>Rennet, Liquid</i>	Liquor Seriparus, N. F. III.
<i>Rennin</i>	Renninum, N. F.
<i>Resin</i>	Resina, U. S. P.
<i>Resina Colophonium</i>	Resina, U. S. P.
<i>Resina Guajaci</i>	Guaiacum, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Resin of Jalap</i>	<i>Resina Jalapæ</i> , U. S. P.
<i>Resin of Podophyllum</i>	<i>Resina Podophylli</i> , U. S. P.
<i>Resin of Scammony</i>	<i>Resina Scammonii</i> , U. S. P.
<i>Resorcin</i>	<i>Resorcinol</i> , U. S. P.
<i>Resorcinol</i>	<i>Resorcinol</i> , U. S. P.
<i>Resorcinol Ointment, Compound</i>	<i>Unguentum Resorcinolis Compositum</i> , N. F.
<i>Resorcinum</i>	<i>Resorcinol</i> , U. S. P.
<i>Rhamnus Cathartica</i>	<i>Rhamnus Cathartica</i> , N. F.
<i>Rhamnus Cathartica, Fluid extract of</i>	<i>Fluidextractum Rhamnus Catharticæ</i> , N. F.
<i>Rhamnus Cathartica, Syrup of</i>	<i>Syrupus Rhamni Catharticæ</i> , N. F.
<i>Rhamnus Purshiana</i> , U. S. P. VIII.....	<i>Cascara Sagrada</i> , U. S. P.
<i>Rhatany</i>	<i>Krameria</i> , N. F.
<i>Rhizoma Filicis</i>	<i>Aspidium</i> , U. S. P.
<i>Rhizoma Gelsemii</i>	<i>Gelsemium</i> , U. S. P.
<i>Rhizoma Hydrastis</i>	<i>Hydrastis</i> , U. S. P.
<i>Rhizoma Rhei</i>	<i>Rheum</i> , U. S. P.
<i>Rhizoma Valerianæ</i>	<i>Valeriana</i> , U. S. P.
<i>Rhizoma Veratri</i>	<i>Veratrum Viride</i> , U. S. P.
<i>Rhizoma Zingiberis</i>	<i>Zingiber</i> , U. S. P.
<i>Rhubarb</i>	<i>Rheum</i> , U. S. P.
<i>Rhubarb, Alkaline Mixture of</i>	<i>Mistura Rhei Alkalina</i> , N. F.
<i>Rhubarb and Gentian, Tincture of</i>	<i>Tinctura Rhei et Gentianæ</i> , N. F.
<i>Rhubarb and Magnesia, Anisated Powder of</i>	<i>Pulvis Rhei et Magnesie Anisatus</i> , N. F.
<i>Rhubarb and Magnesium Acetate, Elixir of</i>	<i>Elixir Rhei et Magnesii Acetatis</i> , N. F. III.
<i>Rhubarb and Soda, Mixture of</i>	<i>Mistura Rhei et Sodæ</i> , N. F.
<i>Rhubarb, Aqueous Tincture of</i>	<i>Tinctura Rhei Aquosa</i> , N. F.
<i>Rhubarb, Aromatic Syrup of</i>	<i>Syrupus Rhei Aromaticus</i> , U. S. P.
<i>Rhubarb, Aromatic Tincture of</i>	<i>Tinctura Rhei Aromatica</i> , U. S. P.
<i>Rhubarb, Compound Mixture of</i>	<i>Mistura Rhei Composita</i> , N. F.
<i>Rhubarb, Compound Pills of</i>	<i>Pilulæ Rhei Compositæ</i> , U. S. P.
<i>Rhubarb, Compound Powder of</i>	<i>Pulvis Rhei Compositus</i> , U. S. P.
<i>Rhubarb, Compound Wine of</i>	<i>Vinum Rhei Compositum</i> , N. F.
<i>Rhubarb, Elixir of</i>	<i>Elixir Rhei</i> , N. F. III.
<i>Rhubarb, Extract of</i>	<i>Extractum Rhei</i> , U. S. P.
<i>Rhubarb, Fluidextract of</i>	<i>Fluidextractum Rhei</i> , U. S. P.
<i>Rhubarb, Fluid glycerate of</i>	<i>Fluidglyceratum Rhei</i> , N. F.
<i>Rhubarb, Pills of</i>	<i>Pilulæ Rhei</i> , N. F.
<i>Rhubarb, Syrup of</i>	<i>Syrupus Rhei</i> , U. S. P.
<i>Rhubarb, Sweet Tincture of</i>	<i>Tinctura Rhei Dulcis</i> , N. F.
<i>Rhubarb, Tincture of</i>	<i>Tinctura Rhei</i> , U. S. P.
<i>Rhubarb, Vinous Tincture of</i>	<i>Tinctura Rhei Vinosa</i> , N. F. III.
<i>Rhus Glabra</i>	<i>Rhus Glabra</i> , N. F.
<i>Rhus Glabra, Fluidextract of</i>	<i>Fluidextractum Rhois Glabræ</i> , N. F.
<i>Roasted Coffee</i>	<i>Coffea Tosta</i> , N. F.
<i>Rochelle Salt</i>	<i>Potassii et Sodii Tartras</i> , U. S. P.
<i>Rock-Rose</i>	<i>Helianthemum</i> , N. F.
<i>Rose, Compound Infusion of</i>	<i>Infusum Rosæ Compositum</i> , N. F. III.
<i>Rose, Confection of</i>	<i>Confectio Rosæ</i> , N. F.
<i>Rose, Fluidextract of</i>	<i>Fluidextractum Rosæ</i> , U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued

Rose, Honey of.....	Mel Rosæ, U. S. P.
Rosemary Oil.....	Oleum Rosmarini, U. S. P.
Rose, Oil of.....	Oleum Rosæ, U. S. P. VIII.
Rose, Red.....	Rosa Gallica, U. S. P.
Rose, Syrup of.....	Syrupus Rosæ, N. F.
Rose Water.....	Aqua Rosæ, U. S. P.
Rose Water, Ointment of.....	Unguentum Aquæ Rosæ, U. S. P.
Rose Water, Stronger.....	Aqua Rosæ Fortior, U. S. P.
Rosin.....	Resina, U. S. P.
Rosin Adhesive Plaster.....	Emplastrum Resinæ, U. S. P.
Rosin Cerate.....	Ceratum Resinæ, U. S. P.
Rosin Cerate, Compound.....	Ceratum Resinæ Compositum, N. F.
Rosin Plaster.....	Emplastrum Resinæ, U. S. P.
Rubber.....	Elastica, U. S. P. VIII.
Rubber Adhesive Plaster.....	Emplastrum Elasticum, U. S. P.
Rubber Plaster.....	Emplastrum Elasticum, U. S. P.
Rubefacient Spice Powder.....	Pulvis Aromaticus Rubefaciens, N. F.
Rubus.....	Rubus, N. F.
Rubus, Fluidextract of.....	Fluidextractum Rubi, N. F.
Rubus, Syrup of.....	Syrupus Rubi, N. F.
Rumex.....	Rumex, N. F.
Rumex, Fluidextract of.....	Fluidextractum Rumicis, N. F.
Russian Flies.....	Cantharis, U. S. P.
<i>Sabal</i>	<i>Sabal</i> , U. S. P.
Sabal, Fluidextract of.....	Fluidextractum Sabal, U. S. P.
Saccharated Citric Acid.....	Acidum Citricum Saccharatum, N. F. III.
Saccharated Ferric Oxide.....	Ferri Oxidum Saccharatum, N. F.
Saccharated Ferrous Iodide.....	Ferri Iodidum Saccharatum, N. F. III.
Saccharated Pepsin.....	Pepsinum Saccharatum, N. F.
Saccharated Sodium Bicarbonate.....	Sodii Bicarbonas Saccharatus, N. F. III.
Saccharated Tartaric Acid.....	Acidum Tartaricum Saccharatum, N. F. III.
Saccharin.....	Benzosulphinidum, U. S. P.
Saccharin, Solution of.....	Liquor Saccharini, N. F. III.
Saccharinum.....	Benzosulphinidum, U. S. P.
Saccharum Ustum.....	Caramel, N. F.
Saffron.....	Crocus, N. F.
Saffron, Tincture of.....	Tinctura Croci, N. F.
Safrol.....	Safrolum, U. S. P. VIII.
Saigon Cinnamon.....	Cinnamomum Saigonicum, U. S. P.
Saint Ignatius Bean.....	Ignatia, N. F.
Salep, Mucilage of.....	Mucilago Salep, N. F. III.
Salicin.....	Salicinum, U. S. P.
Salve Mulla.....	Mullæ, N. F.
Salicylas Natricus.....	Sodii Salicylas, U. S. P.
Salicylas Phenylcus.....	Phenylis Salicylas, U. S. P.
Salicylas Physostigmaticus.....	Physostigminæ Salicylas, U. S. P.
Salicylated Creosote Mulla.....	Mulla Creosoti Salicylata, N. F.
Salicylated Mixture of Iron.....	Liquor Ferri Salicylatis, N. F.
Salicylic Acid.....	Acidum Salicylicum, U. S. P.
Salicylic Acid, Elixir of.....	Elixir Acidi Salicylici, N. F. III.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Salicylic Acid Glycerogelatin</i>	Glycerogelatinum Acidi Salicylici, N. F.
<i>Salicylic Acid Mull</i>	Mulla Acidi Salicylici, N. F.
<i>Salicylic Acid Pencil</i>	Stilus Acidi Salicylici Dilubilis, N. F.
<i>Salicylic Acid Salve Mull</i>	Mulla Acidi Salicylici, N. F.
<i>Salol</i>	Phenylis Salicylas, U. S. P.
<i>Salolum</i>	Phenylis Salicylas, U. S. P.
<i>Salt, Artificial Carlsbad</i>	Sal Carolinum Factitium, N. F.
<i>Salt, Artificial Kissingen</i>	Sal Kissingense Factitium, N. F.
<i>Salt, Artificial Vichy</i>	Sal Vichyanum Factitium, N. F.
<i>Salt, Effervescent Artificial Carlsbad</i>	Sal Carolini Factitium Effervescens, N. F.
<i>Salt, Effervescent Artificial Kissingen</i> ..	Sal Kissingensis Factitium Effervescens, N. F.
<i>Salt, Effervescent Artificial Vichy</i>	Sal Vichyani Factitium Effervescens, N. F.
<i>Salt of Potassium Bromide, Compound Effervescent</i>	Sal Potassii Bromidi Effervescens, N. F.
<i>Salt of Potassium Bromide, Effervescent</i> ..	Sal Potassii Bromidi Effervescens, N. F.
<i>Saltpetre</i>	Potassii Nitras, U. S. P.
<i>Salts, Granular Effervescent</i>	Salas Effervescentes, N. F.
<i>Salt with Lithium, Effervescent Artificial Vichy</i>	Sal Vichyani Factitium Effervescens cum Lithio, N. F.
<i>Salvia</i>	Salvia, U. S. P. VIII.
<i>Sambucus</i>	Sambucus, N. F.
<i>Sanguinaria</i>	Sanguinaria, U. S. P.
<i>Sanguinaria, Fluidextract of</i>	Fluidextractum Sanguinariæ, U. S. P.
<i>Sanguinaria, Syrup of</i>	Syrupus Sanguinariæ, U. S. P.
<i>Sanguinaria, Vinegar of</i>	Acetum Sanguinariæ, N. F. III.
<i>Santal, Oil of</i>	Oleum Santali, U. S. P.
<i>Santalwood Oil</i>	Oleum Santali, U. S. P.
<i>Santonica</i>	Santonica, U. S. P. VIII.
<i>Santonin</i>	Santoninum, U. S. P.
<i>Santonin and Calomel, Troches of</i>	Trochisci Santonini Composita, N. F.
<i>Santonin, Troches of</i>	Trochisci Santonini, N. F.
<i>Sapo Kalinus</i>	Sapo Mollis, U. S. P.
<i>Sapo Medicatus</i>	Sapo, U. S. P.
<i>Saponated Tincture of Creosol</i>	Tinctura Cresolis Saponata, N. F. III.
<i>Sarsaparilla</i>	Sarsaparilla, U. S. P.
<i>Sarsaparilla, Compound Decoction of</i>	Decoctum Sarsaparillæ Compositum, N. F.
<i>Sarsaparilla, Compound Fluidextract of</i> ..	Fluidextractum Sarsaparillæ Compositum, U. S. P.
<i>Sarsaparilla, Compound Syrup of</i>	Syrupus Sarsaparillæ Compositus, U. S. P.
<i>Sassafras</i>	Sassafras, U. S. P.
<i>Sassafras Oil</i>	Oleum Sassafras, U. S. P.
<i>Sassafras Pith</i>	Sassafras Medulla, N. F.
<i>Sassafras Pith, Mucilage of</i>	Mucilago Sassafras Medullæ, N. F.
<i>Saturatio Potio Riveri</i>	Liquor Sodii Citratis, N. F.
<i>Savine Cerate</i>	Ceratum Sabinæ, N. F. III.
<i>Savin, Fluidextract of</i>	Fluidextractum Sabinæ, U. S. P. VIII.
<i>Savin, Oil of</i>	Oleum Sabinæ, U. S. P. VIII.
<i>Saw Palmetto and Santal, Tincture of</i>	Tinctura Sabal et Santali, N. F.
<i>Saw Palmetto Berries</i>	Sabal, U. S. P.
<i>Scammony</i>	Scammonium, U. S. P. VIII.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Scammony, Resin of.....	Resina Scammonii, U. S. P.
Scammony Root.....	Scammonii Radix, U. S. P.
Scoparius.....	Scoparius, N. F.
Scoparius, Fluidextract of.....	Fluidextractum Scoparii, N. F.
Scopola.....	Scopola, U. S. P. VIII.
Scopola, Fluidextract of.....	Fluidextractum Scopolæ, U. S. P. VIII.
Scopola, Extract of.....	Extractum Scopolæ, U. S. P. VIII.
Scopolamine Bromide.....	Scopolaminæ Hydrobromidum, U. S. P.
Scopolamine Hydrobromide.....	Scopolaminæ Hydrobromidum, U. S. P.
Scopolaminum Hydrobromicum.....	Scopolaminæ Hydrobromidum, U. S. P.
Scutellaria.....	Scutellaria, N. F.
Scutellaria, Fluidextract of.....	Fluidextractum Scutellariæ, N. F.
Sebum Ovale.....	Sevum Præparatum, U. S. P.
Secale Cornutum P. I.....	Ergota, U. S. P.
Sedative Water.....	Lotio Ammoniacalis Camphora, N. F.
Semen Amygdali Dulce.....	Amygdala Dulcis, U. S. P.
Semen Colchici P. I.....	Colchici Semen, U. S. P.
Semen Lini.....	Linum, U. S. P.
Semen Myristicæ.....	Myristica, U. S. P.
Semen Sinapis.....	Sinapis Alba, U. S. P.
Semen Sinapis Nigræ.....	Sinapis Nigra, U. S. P.
Semen Strophanthi.....	Strophanthus, U. S. P.
Semen Strychni, P. I.....	Nux Vomica, U. S. P.
Seneca Snakeroot.....	Senega, U. S. P.
Senecio.....	Senecio, N. F.
Senecio, Fluidextract of.....	Fluidextractum Senecionis, N. F.
Senega.....	Senega, U. S. P.
Senega Snakeroot.....	Senega, U. S. P.
Senega, Fluidextract of.....	Fluidextractum Senegæ, U. S. P.
Senega, Syrup of.....	Syrupus Senegæ, U. S. P.
Senna.....	Senna, U. S. P.
Senna, Aromatic Syrup of.....	Syrupus Sennæ Aromaticus, N. F.
Senna, Compound Infusion of.....	Infusum Sennæ Compositum, U. S. P.
Senna, Compound Syrup of.....	Syrupus Sennæ Compositus, N. F.
Senna, Confection of.....	Confectio Sennæ, N. F.
Senna, Fluidextract of.....	Fluidextractum Sennæ, U. S. P.
Senna, Syrup of.....	Syrupus Sennæ, U. S. P.
Serpentaria.....	Serpentaria, U. S. P.
Serpentaria, Fluidextract of.....	Fluidextractum Serpentariæ, N. F.
Serpentaria, Tincture of.....	Tinctura Serpentariæ, N. F.
Serum, Antidiphtheric.....	Serum Antidiphthericum, U. S. P.
Serum, Antitetanic.....	Serum Antitetanicum, U. S. P.
Serum, Dried Antidiphtheric.....	Serum Antidiphthericum Siccum, U. S. P.
Serum, Dried Antitetanic.....	Serum Antitetanicum Siccum, U. S. P.
Serum, Purified Antitetanic.....	Serum Antitetanicum Purificatum, U. S. P.
Sesame Oil.....	Oleum Sesami, U. S. P.
Seven-Barks.....	Hydrangea, N. F.
Sherry Wine.....	Vinum Xericum, N. F.
Siliceous Earth, Purified.....	Terra Silicea Purificata, U. S. P.
Silver Cyanide.....	Argenti Cyanidium, U. S. P. VIII.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Silver Oxide</i>	Argenti Oxidum, U. S. P.
<i>Silver Nitrate</i>	Argenti Nitras, U. S. P.
<i>Silver Nitrate, Mitigated</i>	Argenti Nitras Mitigatus, U. S. P. VIII.
<i>Silver Nitrate, Moulded</i>	Argenti Nitras Fusus, U. S. P.
<i>Simple Elixir</i>	Elixir Aromaticum, U. S. P.
<i>Simple Cerate</i>	Ceratum, U. S. P.
<i>Simple Ointment</i>	Unguentum, U. S. P.
<i>Simple Syrup</i>	Syrupus, U. S. P.
<i>Sirup</i>	Syrupus, U. S. P.
<i>Sirupus Aurantii Corticis</i>	Syrupus Aurantii, U. S. P.
<i>Sirupus Citri</i>	Syrupus Acidi Citrici, U. S. P.
<i>Sirupus Rhei</i>	Syrupus Rhei, U. S. P.
<i>Sirupus Senegae</i>	Syrupus Senegæ, U. S. P.
<i>Sirupus Sennae</i>	Syrupus Sennæ, U. S. P.
<i>Sirupus Simplex</i>	Syrupus, U. S. P.
<i>Skullcap</i>	Scutellaria, N. F.
<i>Slippery Elm</i>	Ulmus, U. S. P.
<i>Smith's Solution of Bromine</i>	Liquor Bromi, N. F.
<i>Smyrna Galls</i>	Galla, U. S. P.
<i>Soap</i>	Sapo, U. S. P.
<i>Soap Liniment</i>	Linimentum Saponis, U. S. P.
<i>Soap Liniment, Camphorated</i>	Linimentum Saponato-Camphoratum, N. F.
<i>Soap, Liniment of Soft</i>	Linimentum Saponis Mollis, U. S. P.
<i>Soap Plaster</i>	Emplastrum Saponis, N. F.
<i>Soap, Soft</i>	Sapo, Mollis, U. S. P.
<i>Soap-tree, Bark</i>	Quillaja, N. F.
<i>Soap, Spirit of</i>	Spiritus Saponatus, N. F. III.
<i>Socotrine Aloes</i>	Aloe, U. S. P.
<i>Soda and Spearmint, Solution of</i>	Liquor Sodæ et Menthæ, N. F.
<i>Soda</i>	Sodii Hydroxidum, U. S. P.
<i>Soda Mint</i>	Liquor Sodæ et Menthæ, N. F.
<i>Soda with Lime</i>	Soda cum Calce, N. F.
<i>Sodium Acetate</i>	Sodii Acetas, U. S. P.
<i>Sodium Arsenate</i>	Sodii Arsenas, U. S. P.
<i>Sodium Arsenate, Exsiccated</i>	Sodii Arsenas Exsiccatus, U. S. P.
<i>Sodium Arsenate, Solution of</i>	Liquor Sodii Arsenatis, U. S. P.
<i>Sodium Arsenate, Pearson's Solution of</i>	Liquor Sodii Arsenatis, Pearson, N. F.
<i>Sodium Benzosulphinide</i>	Sodii Benzosulphinidum, U. S. P.
<i>Sodium Benzoate</i>	Sodii Benzoas, U. S. P.
<i>Sodium Bicarbonate</i>	Sodii Bicarbonas, U. S. P.
<i>Sodium Bicarbonate, Saccharated</i>	Sodii Bicarbonas Saccharatus, N. F. III.
<i>Sodium Bicarbonate, Troches of</i>	Trochisci Sodii Bicarbonatis, U. S. P.
<i>Sodium Bisulphite</i>	Sodii Bisulphis, U. S. P. VIII.
<i>Sodium Borate</i>	Sodii Boras, U. S. P.
<i>Sodium Borate, Compound Solution of</i>	Liquor Sodii Boratis Compositus, N. F.
<i>Sodium Borate, Honey of</i>	Mel Sodii Boratis, N. F.
<i>Sodium Boro Benzoate</i>	Sodii Boro-Benzoas, N. F.
<i>Sodium Bromide</i>	Sodii Bromidum, U. S. P.
<i>Sodium Bromide, Elixir of</i>	Elixir Sodii Bromidi, N. F.
<i>Sodium Cacodylate</i>	Sodii Cacodylas, U. S. P.
<i>Sodium Carbolate, Solution of</i>	Liquor Sodii Carbolatis, N. F. III.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Sodium Carbonate, Dried.....	Sodii Carbonas Exsiccatus, N. F. III.
Sodium Carbonate, Monohydrated.....	Sodii Carbonas, Monohydratus, U. S. P.
<i>Sodium Chlorate</i>	Sodii Chloras, U. S. P. VIII.
<i>Sodium Chloride</i>	Sodii Chloridum, U. S. P.
Sodium Chloride, Physiological Solution of.....	Liquor Sodii Chloridi Physiologicus, U. S. P.
<i>Sodium Citrate</i>	Sodii Citras, U. S. P.
Sodium Citrate, Solution of.....	Liquor Sodii Citratis, N. F.
Sodium Citro-Tartrate, Effervescent Solution of.....	Liquor Sodii Citro-Tartratis Effervescens, N. F.
<i>Sodium Cyanide</i>	Sodii Cyanidum, U. S. P.
<i>Sodium Glycerophosphate</i>	Sodii Glycerophosphas, U. S. P.
Sodium Glycerophosphate, Solution of.....	Liquor Sodii Glycerophosphatis, U. S. P.
Sodium Hydrate.....	Sodii Hydroxidum, U. S. P.
<i>Sodium Hydroxide</i>	Sodii Hydroxidum, U. S. P.
Sodium Hydroxide, Solution of.....	Liquor Sodii Hydroxidi, U. S. P.
<i>Sodium Hypophosphite</i>	Sodii Hypophosphis, U. S. P.
Sodium Hypophosphite, Elixir of.....	Elixir Sodii Hypophosphitis, N. F.
Sodium Hypophosphite, Syrup of.....	Syrupus Sodii Hypophosphitis, N. F.
Sodium Hyposulphite.....	Sodii Thiosulphas, U. S. P.
<i>Sodium Indigotindisulphonate</i>	Sodii Indigotindisulphonas, U. S. P.
<i>Sodium Iodide</i>	Sodii Iodidum, U. S. P.
<i>Sodium Nitrate</i>	Sodii Nitras, U. S. P. VIII.
<i>Sodium Nitrite</i>	Sodii Nitris, U. S. P.
Sodium Oleate, Solution of.....	Liquor Sodii Oleatis, N. F. III.
<i>Sodium Perborate</i>	Sodii Perboras, U. S. P.
<i>Sodium Phenolsulphonate</i>	Sodii Phenolsulphonas, U. S. P.
<i>Sodium Phosphate</i>	Sodii Phosphas, U. S. P.
Sodium Phosphate, Compound Solution of.....	Liquor Sodii Phosphatis Compositus, N. F.
Sodium Phosphate, Effervescent.....	Sodii Phosphas Effervescens, U. S. P.
Sodium Phosphate, Exsiccated.....	Sodii Phosphas, Exsiccatus, U. S. P.
Sodium Pyroborate.....	Sodii Boras, U. S. P.
<i>Sodium Pyrophosphate</i>	Sodii Pyrophosphas, U. S. P. VIII.
Sodium-Saccharin.....	Sodii Benzosulphinidum, U. S. P.
<i>Sodium Salicylate</i>	Sodii Salicylas, U. S. P.
Sodium Salicylate, Compound Elixir of.....	Elixir Sodii Salicylatis Compositum, N. F.
Sodium Salicylate, Elixir of.....	Elixir Sodii Salicylatis, N. F.
Sodium Santoninate, Troches of.....	Trochisci Sodii Santoninatis, N. F. III.
<i>Sodium Sulphate</i>	Sodii Sulphas, U. S. P.
<i>Sodium Sulphite</i>	Sodii Sulphis, U. S. P. VIII.
Sodium Sulphite, Exsiccated.....	Sodii Sulphis, Exsiccatus, U. S. P.
Sodium Sulphocarbolate.....	Sodii Phenolsulphonas, U. S. P.
Sodium Tetraborate.....	Sodii Boras, U. S. P.
<i>Sodium Thiosulphate</i>	Sodii Thiosulphas, U. S. P.
<i>Soft Soap</i>	Sapo Mollis, U. S. P.
Soft Soap, Liniment of.....	Linimentum Saponis Mollis, U. S. P.
Soft Soap, Compound Liniment of.....	Linimentum Saponis Mollis Compositum, N. F.
<i>Soft Zinc Glycerogelatin</i>	Glycerogelatinum Zinci Molle, N. F.
<i>Soft Zinc Paste</i>	Pasta Zinci Mollis, N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Soft Zinc Paste, Unna's.....	Pasta Zinci Mollis, N. F.
<i>Solanum</i>	<i>Solanum</i> , N. F.
Solanum, Fluidextract of.....	Fluidextractum Solani, N. F.
Solidified Copaiba.....	Massa Copaibæ, N. F.
Solid Opodeldoc.....	Linimentum Saponato-Camphoratum, N. F.
Solid Petrox.....	Petroxolinum Spissum, N. F.
<i>Solid Petrozolin</i>	Petroxolinum Spissum, N. F.
<i>Soluble Antiseptic Powder</i>	Pulvis Antisepticus, N. F.
Soluble Cocoa.....	Cacao Præparata, N. F.
Soluble Ferric Citrate.....	Ferri et Ammonii Citras, U. S. P.
Soluble Ferric Oxide.....	Ferri Oxidum Saccharatum, N. F.
Soluble Ferric Phosphate.....	Ferri Phosphas, U. S. P.
Soluble Ferric Pyrophosphate.....	Ferri Pyrophosphas, N. F.
Soluble Gun Cotton.....	Pyroxolinum, U. S. P.
<i>Soluble Manganese Citrate</i>	Mangani et Sodii Citras, N. F.
<i>Soluble Manganese Glycerophosphate</i>	Mangani Glycerophosphas Solubilis, N. F.
Soluble Iron and Quinine Citrate.....	Ferri et Quininae Citras, U. S. P.
Soluble Saccharin.....	Sodii Benzosulphinidum, U. S. P.
Soluble Tincture of Tolu.....	Tinctura Tolutana Solubilis, N. F. III.
Solutio Acetatis Ammonici.....	Liquor Ammonii Acetatis, U. S. P.
Solutio Ammoniaci.....	Aqua Ammonia, U. S. P.
Solutio Ammoniaci Concentrata.....	Aqua Ammonia Fortior, U. S. P.
Solutio Chloreti Ferrici.....	Liquor Ferri Chloridi, U. S. P.
Solutio Chloreti Spirituosa.....	Tinctura Ferri Chloridi, U. S. P.
Solutio Formaldehydi.....	Liquor Formaldehydi, U. S. P.
Solutio Hydratis Calcis.....	Liquor Calcis, U. S. P.
Solution, Alkaline Antiseptic.....	Liquor Antisepticus Alkalinus, N. F.
Solution, Antiseptic.....	Liquor Antisepticus, N. F.
Solution of Acid Phosphates.....	Liquor Phosphatum Acidus, N. F.
<i>Solution of Albuminate of Iron</i>	Liquor Ferri Albuminati, N. F.
<i>Solution of Aluminum Acetate</i>	Liquor Alumini Acetatis, N. F.
<i>Solution of Aluminum Acetate, N. F. III.</i>	Liquor Alumini Subacetatis, N. F.
Solution of Aluminum Acetate, Crude.....	Liquor Alumini Acetatis, N. F.
<i>Solution of Aluminum Acetico-Tartrate</i>	Liquor Alumini Acetico-Tartratis, N. F.
<i>Solution of Aluminum Subacetate</i>	Liquor Alumini Subacetatis, N. F.
<i>Solution of Ammonium Acetate</i>	Liquor Ammonii Acetatis, U. S. P.
Solution of Ammonium Acetate, Con- centrated.....	Liquor Ammonii Acetatis Concentratus, N. F. III.
<i>Solution of Ammonium Citrate</i>	Liquor Ammonii Citratis, N. F.
Solution of Ammonium Citrate, Stronger.....	Liquor Ammonii Citratis, Fortior, N. F. III.
Solution of Arsenic, Clemen's.....	Liquor Arsenicalis, Clemen's, N. F.
Solution of Arsenic Hydrochloride.....	Liquor Acidi Arsenosi, U. S. P.
<i>Solution of Arsenous Acid</i>	Liquor Acidi Arsenosi, U. S. P.
<i>Solution of Arsenous and Mercuric Iodide</i>	Liquor Arseni et Hydrargyri Iodidi, U. S. P.
Solution of Basic Ferric Sulphate.....	Liquor Ferri Subsulphatis, U. S. P.
<i>Solution of Benzosulphinide</i>	Liquor Benzosulphinidi, N. F.
<i>Solution of Bismuth</i>	Liquor Bismuthi, N. F.
Solution of Bromide of Arsenic.....	Liquor Potassii Arsenatis et Bromidi, N. F. III.
<i>Solution of Bromine</i>	Liquor Bromi, N. F.
<i>Solution of Calcium Hydroxide</i>	Liquor Calcis, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Solution of Carmine</i>	Liquor Carmini, N. F.
<i>Solution of Chlorinated Potassa</i>	Liquor Potassæ Chlorinatæ, N. F.
<i>Solution of Chlorinated Soda</i>	Liquor Sodæ Chlorinatæ, U. S. P.
<i>Solution of Chlorine, Compound</i>	Liquor Chlori Compositus, N. F.
<i>Solution of Coal Tar</i>	Liquor Picis Carbonis, N. F.
<i>Solution of Cresol, Compound</i>	Liquor Cresolis Compositus, U. S. P.
<i>Solution of Extract of Glycyrrhiza</i>	Liquor Extracti Glycyrrhizæ, N. F. III.
<i>Solution of Ferric Acetate</i>	Liquor Ferri Acetatis, N. F.
<i>Solution of Ferric Chloride</i>	Liquor Ferri Chloridi, U. S. P.
<i>Solution of Ferric Citrate</i>	Liquor Ferri Citratis, N. F.
<i>Solution of Ferric Hypophosphite</i>	Liquor Ferri Hypophosphitis, N. F.
<i>Solution of Ferric Nitrate</i>	Liquor Ferri Nitratis, N. F.
<i>Solution of Ferric Oxychloride</i>	Liquor Ferri Oxychloridi, N. F.
<i>Solution of Ferric Oxysulphate</i>	Liquor Ferri Oxysulphatis, N. F.
<i>Solution of Ferric Salicylate</i>	Liquor Ferri Salicylatis, N. F.
<i>Solution of Ferric Subsulphate</i>	Liquor Ferri Subsulphatis, U. S. P.
<i>Solution of Ferric Sulphate</i>	Liquor Ferri Tersulphatis, U. S. P.
<i>Solution of Ferric Tersulphate</i>	Liquor Ferri Tersulphatis, U. S. P.
<i>Solution of Ferrous Chloride</i>	Liquor Ferri Protochloridi, N. F.
<i>Solution of Ferrous Iodide</i>	Liquor Ferri Iodidi, N. F. III.
<i>Solution of Formaldehyde</i>	Liquor Formaldehydi, U. S. P.
<i>Solution of Ginger</i>	Liquor Zingiberis, N. F. III.
<i>Solution of Gold and Arsenic Bromide</i>	Liquor Auri et Arseni Bromidi, N. F.
<i>Solution of Gutta Percha</i>	Liquor Gutta Perchæ, N. F.
<i>Solution of Hypophosphite of Iron</i>	Liquor Ferri Hypophosphitis, N. F.
<i>Solution of Hypophosphites</i>	Liquor Hypophosphitum, N. F.
<i>Solution of Hydrogen Dioxide</i>	Liquor Hydrogenii Dioxidii, U. S. P.
<i>Solution of Hydrogen Peroxide</i>	Liquor Hydrogenii Dioxidii, U. S. P.
<i>Solution of Hypophysis</i>	Liquor Hypophysis, U. S. P.
<i>Solution of Iodine, Caustic</i>	Liquor Iodi Causticus, N. F. III.
<i>Solution of Iodine, Compound</i>	Liquor Iodi Compositus, U. S. P.
<i>Solution of Iron and Ammonium Acetate</i>	Liquor Ferri et Ammonii Acetatis, U. S. P.
<i>Solution of Iron Perchloride</i>	Liquor Ferri Chloridi, U. S. P.
<i>Solution of Iron Tersulphate</i>	Liquor Ferri Tersulphatis, U. S. P.
<i>Solution of Lead Subacetate</i>	Liquor Plumbi Subacetatis, U. S. P.
<i>Solution of Lead Subacetate, Diluted</i>	Liquor Plumbi Subacetatis, Dilutum, U. S. P.
<i>Solution of Magnesium Bromide</i>	Liquor Magnesii Bromidi, N. F. III.
<i>Solution of Magnesium Citrate</i>	Liquor Magnesii Citratis, U. S. P.
<i>Solution of Mercuric Nitrate</i>	Liquor Hydrargyri Nitratis, N. F.
<i>Solution of Mercury and Potassium Iodides</i>	Liquor Hydrargyri et Potassii Iodidi, N. F.
<i>Solution of Morphine Citrate</i>	Liquor Morphinæ Citratis, N. F. III.
<i>Solution of Morphine, Hypodermic</i>	Liquor Morphinæ Hypodermicus, N. F. III.
<i>Solution of Oxysulphuret of Calcium</i>	Liquor Calcis Sulphuratæ, N. F.
<i>Solution of Pancreatin</i>	Liquor Pancreatini, N. F.
<i>Solution of Pepsin</i>	Liquor Pepsini, N. F.
<i>Solution of Pepsin, Aromatic</i>	Liquor Pepsini Aromaticus, N. F.
<i>Solution of Peptonate of Iron</i>	Liquor Ferri Peptonati, N. F.
<i>Solution of Peptonate of Iron and Man- ganese.</i>	Liquor Ferri Peptonati et Mangani, N. F.
<i>Solution of Phosphates, Compound</i>	Liquor Phosphatum Compositus, N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Solution of Phosphorus</i>	Liquor Phosphori, N. F.
<i>Solution of Potassa</i>	Liquor Potassii Hydroxidi, U. S. P.
<i>Solution of Potassium Arsenate and Bromides</i>	Liquor Arsenicalis, Clemen's, N. F.
<i>Solution of Potassium Arsenite</i>	Liquor Potassii Arsenitis, U. S. P.
<i>Solution of Potassium Citrate</i>	Liquor Potassii Citratis, U. S. P.
<i>Solution of Potassium Hydroxide</i>	Liquor Potassii Hydroxidi, U. S. P.
<i>Solution of Potassium Iodohydrargyrate</i>	Liquor Hydrargyri et Potassii Iodidi, N. F.
<i>Solution of Protochloride of Iron</i>	Liquor Ferri Protochloridi, N. F.
<i>Solution of Saccharin</i>	Liquor Saccharini, N. F. III.
<i>Solution of Soda</i>	Liquor Sodii Hydroxidi, U. S. P.
<i>Solution of Soda and Mint</i>	Liquor Sodæ et Menthæ, N. F.
<i>Solution of Sodium Arsenate</i>	Liquor Sodii Arsenatis, U. S. P.
<i>Solution of Sodium Arsenate, Pearson's</i>	Liquor Sodii Arsenatis, Pearson, N. F.
<i>Solution of Sodium Borate, Compound</i>	Liquor Sodii Boratis Compositus, N. F.
<i>Solution of Sodium Carbolate</i>	Liquor Sodii Carbolatis, N. F. III.
<i>Solution of Sodium Chloride, Physiological</i>	Liquor Sodii Chloridi Physiologicus, U. S. P.
<i>Solution of Sodium Citrate</i>	Liquor Sodii Citratis, N. F.
<i>Solution of Sodium Glycerophosphate</i>	Liquor Sodii Glycerophosphatis, U. S. P.
<i>Solution of Sodium Hydroxide</i>	Liquor Sodii Hydroxidi, U. S. P.
<i>Solution of Sodium Citro-Tartrate, Effervescent</i>	Liquor Sodii Citro-Tartaris Effervescens, N. F.
<i>Solution of Sodium Oleate</i>	Liquor Sodii Oleatis, N. F. III.
<i>Solution of Sodium Phosphate, Compound</i>	Liquor Sodii Phosphatis Compositus, N. F.
<i>Solution of Strychnine Acetate</i>	Liquor Strychninæ Acetatis, N. F.
<i>Solution of Sulphurated lime</i>	Liquor Calcis Sulphuratæ, N. F.
<i>Solution of Tar, Alkaline</i>	Liquor Picis Alkalinus, N. F.
<i>Solution of the Pituitary Body</i>	Liquor Hypophysis, U. S. P.
<i>Solution of Zinc and Aluminum, Compound</i>	Liquor Zinci et Alumini Compositus, N. F.
<i>Solution of Zinc and Iron, Compound</i>	Liquor Zinci et Ferri Compositum, N. F.
<i>Solution of Zinc Chloride</i>	Liquor Zinci Chloridi, U. S. P.
<i>Solutio Salina</i>	Liquor Sodii Chloridi Physiologicus, U. S. P.
<i>Solutio Subacetatis Plumbici</i>	Liquor Plumbi Subacetatis, U. S. P.
<i>Spanish Flies</i>	Cantharis, U. S. P.
<i>Sparteine Sulphate</i>	Sparteinae Sulphas, U. S. P.
<i>Sparteinum Sulfuricum</i>	Sparteinae Sulphas, U. S. P.
<i>Spearmint</i>	Mentha Viridis, U. S. P.
<i>Spearmint oil</i>	Oleum Menthæ Viridis, U. S. P.
<i>Spearmint, Spirit of</i>	Spiritus Menthæ Viridis, U. S. P.
<i>Spearmint Water</i>	Aqua Menthæ Viridis, U. S. P.
<i>Species Ad Infusum Pectorale</i>	Species Pectorales, N. F.
<i>Species, Emollient</i>	Species Emollientes, N. F.
<i>Species, Laxative</i>	Species, Laxativæ, N. F.
<i>Species, Pectoral</i>	Species Pectorales, N. F.
<i>Spermaceti</i>	Cetaceum, U. S. P.
<i>Spermaceti Cerate</i>	Ceratum Cetacei, N. F. III.
<i>Spiced Syrup of Rhubarb</i>	Syrupus Rhei Aromaticus, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Spice Plaster.....	Emplastrum Aromaticum, N. F. III.
<i>Spigelia</i>	<i>Spigelia</i> , U. S. P.
<i>Spigelia</i> , Fluidextract of.....	Fluidextractum <i>Spigeliæ</i> , U. S. P.
<i>Spignet</i>	<i>Aralia</i> , N. F.
Spirit, Aromatic.....	<i>Spiritus Aromaticus</i> , N. F.
<i>Spirit of Ammonia</i>	<i>Spiritus Ammoniacæ</i> , U. S. P. VIII.
Spirit of Ammonia, Anisated.....	<i>Spiritus Ammoniaci Anisatus</i> , N. F.
Spirit of Ammonia, Aromatic.....	<i>Spiritus Ammoniacæ Aromaticus</i> , U. S. P.
<i>Spirit of Anise</i>	<i>Spiritus Anisi</i> , U. S. P.
Spirit of Ants.....	<i>Spiritus Acidi Formici</i> , N. F.
<i>Spirit of Volatile Oil</i>	<i>Spiritus Oleorum Volatilium</i> , N. F.
<i>Spirit of Bitter Almond</i>	<i>Spiritus Amygdalæ Amaræ</i> , U. S. P.
<i>Spirit of Camphor</i>	<i>Spiritus Camphoræ</i> , U. S. P.
Spirit of Cardamom, Compound.....	<i>Spiritus Cardamomi Compositus</i> , N. F.
<i>Spirit of Chloroform</i>	<i>Spiritus Chloroformi</i> , U. S. P.
<i>Spirit of Cinnamon</i>	<i>Spiritus Cinnamomi</i> , U. S. P.
<i>Spirit of Curacao</i>	<i>Spiritus Curassao</i> , N. F. III.
<i>Spirit of Ether</i>	<i>Spiritus Ætheris</i> , U. S. P.
Spirit of Ether, Compound.....	<i>Spiritus Ætheris Compositus</i> , N. F.
<i>Spirit of Formic Acid</i>	<i>Spiritus Acidi Formici</i> , N. F.
<i>Spirit of Gaultheria</i>	<i>Spiritus Gaultheriæ</i> , U. S. P. VIII.
Spirit of Glonoin.....	<i>Spiritus Glycerylis Nitratis</i> , U. S. P.
<i>Spirit of Glyceryl Trinitrate</i>	<i>Spiritus Glycerylis Nitratis</i> , U. S. P.
<i>Spirit of Juniper</i>	<i>Spiritus Juniperi</i> , U. S. P.
Spirit of Juniper, Compound.....	<i>Spiritus Juniperi Compositus</i> , U. S. P.
<i>Spirit of Lavender</i>	<i>Spiritus Lavandulæ</i> , U. S. P.
<i>Spirit of Lemon</i>	<i>Spiritus Limonis</i> , N. F. III.
Spirit of Mindererus.....	<i>Liquor Ammoniaci Acetatis</i> , U. S. P.
<i>Spirit of Mustard</i>	<i>Spiritus Sinapis</i> , N. F.
Spirit of Myrciæ Compound.....	<i>Spiritus Myrciæ Compositus</i> , N. F.
Spirit of Nitroglycerin.....	<i>Spiritus Glycerylis Nitratis</i> , U. S. P.
<i>Spirit of Nitrous Ether</i>	<i>Spiritus Ætheris Nitrosi</i> , U. S. P.
<i>Spirit of Nutmeg</i>	<i>Spiritus Myristicæ</i> , N. F. III.
<i>Spirit of Orange</i>	<i>Spiritus Aurantii</i> , N. F. III.
Spirit of Orange, Compound.....	<i>Spiritus Aurantii Compositus</i> , U. S. P.
<i>Spirit of Peppermint</i>	<i>Spiritus Menthæ Pipritæ</i> , U. S. P.
<i>Spirit of Phosphorus</i>	<i>Spiritus Phosphori</i> , N. F. III.
Spirit of Salt.....	<i>Acidum Hydrochloricum</i> , U. S. P.
<i>Spirit of Soap</i>	<i>Spiritus Saponatus</i> , N. F. III.
<i>Spirit of Spearmint</i>	<i>Spiritus Menthæ Viridis</i> , U. S. P.
Spirits of Turpentine.....	<i>Oleum Terebinthinæ</i> , U. S. P.
Spirit of Vanillin, Compound.....	<i>Spiritus Vanillini Compositus</i> , N. F.
<i>Spirit of Volatile Oils</i>	<i>Spiritus Oleorum Volatilium</i> , N. F.
Spirit, Ophthalmic.....	<i>Spiritus Ophthalmicus</i> , N. F. III.
Spirit, Perfumed.....	<i>Spiritus Odoratus</i> , N. F.
<i>Spiritus</i>	<i>Alcohol</i> , U. S. P.
<i>Spiritus Ætherus</i>	<i>Spiritus Ætheris</i> , U. S. P.
<i>Spiritus Camphoratus</i>	<i>Spiritus Camphoræ</i> , U. S. P.
<i>Spiritus Dilutus</i>	<i>Alcohol Dilutum</i> , U. S. P.
<i>Spiritus Formicarum</i>	<i>Spiritus Acidi Formici</i> , N. F.
<i>Spiritus Saponatis</i>	<i>Linimentum Saponis Mollis</i> , U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Spiritus Saponis Camphoratus</i>	Linimentum Saponis, U. S. P.
Spleen Mixture.....	Mistura Splenetica, N. F. III.
Splenetic Mixture.....	Mistura Splenetica, N. F. III.
Sponge, Compressed.....	Spongia Compressa, N. F. III.
Sponge, Decolorized.....	Spongia Decolorata, N. F. III.
Sponge Tent.....	Spongia Compressa, N. F. III.
Spray, Aromatic Oil.....	Nebula, Aromatic, N. F.
Spray, Compound Menthol.....	Nebula Mentholis Composita, N. F.
Spray, Eucalyptol.....	Nebula Eucalyptolis, N. F.
Spray, Menthol.....	Nebula Mentholis, N. F.
Spray, Thymol.....	Nebula Thymolis, N. F.
Spurred Rye.....	Ergota, U. S. P.
Squaw Root.....	Caulophyllum, N. F.
Squibb's Diarrhoea Mixture.....	Mistura Opii et Chloroformi Composita, N. F.
Squibb's Rhubarb Mixture.....	Mistura Rhei Composita, N. F. III.
<i>Squill</i>	Scilla, U. S. P.
Squill, Compound Syrup of.....	Syrupus Scillæ Compositus, U. S. P.
Squill, Fluidextract of.....	Fluidextractum Scillæ, U. S. P.
Squill, Oxymel of.....	Oxymel Scillæ, N. F.
Squill, Syrup of.....	Syrupus Scillæ, U. S. P.
Squill, Tincture of.....	Tinctura Scillæ, U. S. P.
Squirrel Corn.....	Corydalis, N. F.
<i>Staphisagria</i>	Staphisagria, U. S. P.
Staphisagria, Fluidextract of.....	Fluidextractum Staphisagriæ, U. S. P.
<i>Starch</i>	Amylum, U. S. P.
Starch, Glycerite of.....	Glyceritum Amyli, U. S. P.
Starch, Iodized.....	Amylum Iodatum, N. F. III.
Star Grass.....	Aletris, N. F.
Stavesacre.....	Staphisagria, U. S. P.
<i>Stearic Acid</i>	Acidum Stearicum, U. S. P.
<i>Stearinum</i>	Acidum Stearicum, U. S. P.
Steatina.....	Unguenta Extensa, N. F. III.
Steatins.....	Mullæ, N. F.
<i>Sterilized Distilled Water</i>	Aqua Destillata Sterilizata, U. S. P.
St. Germain Tea.....	Species Laxativæ, N. F.
<i>Stillingia</i>	Stillingia, U. S. P.
Stillingia, Compound Elixir of.....	Elixir Stillingiæ Compositum, N. F. III.
Stillingia, Compound Fluidextract of.....	Fluidextractum Stillingiæ Compositum, N. F.
Stillingia, Compound Syrup of.....	Syrupus Stillingiæ Compositus, N. F.
Stillingia, Fluidextract of.....	Fluidextractum Stillingiæ, U. S. P.
St. John Long's Liniment.....	Linimentum Terebinthinæ Aceticum, N. F.
<i>Stokes' Expectorant</i>	Mistura Pectoralis, Stokes, N. F.
Stokes' Liniment.....	Linimentum Terebinthinæ, Aceticum, N. F.
Stokes' Mixture.....	Mistura Pectoralis, Stokes, N. F.
Stomach Drops.....	Tinctura Amara, N. F.
Stomachic Tincture.....	Tinctura Amara, N. F.
<i>Storax</i>	Styrax, U. S. P.
<i>Stramonium</i>	Stramonium, U. S. P.
Stramonium, Extract of.....	Extractum Stramonium, U. S. P.
Stramonium, Fluidextract of.....	Fluidextractum Stramonii, N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Stramonium Ointment</i>	Unguentum Stramonii, U. S. P.
<i>Stramonium, Tincture of</i>	Tinctura Stramonii, U. S. P.
<i>Stramonium Seed, Fluidextract of</i>	Fluidextractum Stramonii Seminis, N. F.
III.	
<i>Stramonium Seed, Extract of</i>	Extractum Stramonii Seminis, N. F. III.
<i>Stramonium Seed, Tincture of</i>	Tinctura Stramonii Seminis, N. F. III.
<i>Strengthening Plaster</i>	Emplastrum Ferri, N. F. III.
<i>Stronger Ammonia Water</i>	Aqua Ammoniae Fortior, U. S. P.
<i>Stronger Compound Infusion of Gentian</i>	Infusum Gentianae Compositum, Fortius, N. F. III.
<i>Stronger Emulsion of Oil of Turpentine</i>	Emulum Olei Terebinthinae Fortior, N. F.
III.	
<i>Stronger Orange Flower Water</i>	Aqua Aurantii Florum Fortior, U. S. P.
<i>Stronger Pills of Iron, Quinine, Strychnine and Arsenic</i>	Pilulae Ferri Quininae Strychninae, Arseni Fortiores, N. F.
<i>Stronger Resorcinol Paste</i>	Pasta Resorcinolis Fortior, N. F.
<i>Stronger Rose Water</i>	Aqua Rosae Fortior, U. S. P.
<i>Stronger Solution of Ammonium Citrate</i>	Liquor Ammonii Citratis Fortior, N. F. III.
<i>Stronger Tincture of Iodine</i>	Tinctura Iodi Fortior, N. F.
<i>Stronger White Wine</i>	Vinum Album Fortius, N. F. III.
<i>Strontium Bromide</i>	Strontii Bromidum, U. S. P.
<i>Strontium Carbonate</i>	Strontii Carbonas, N. F.
<i>Strontium Iodide</i>	Strontii Iodidum, U. S. P.
<i>Strontium Salicylate</i>	Strontii Salicylas, U. S. P.
<i>Strophanthin</i>	Strophanthinum, U. S. P.
<i>Strophanthi Tinctura P. I.</i>	Tinctura Strophanthi, U. S. P.
<i>Strophanthus</i>	Strophanthus, U. S. P.
<i>Strophanthus, Tincture of</i>	Tinctura Strophanthi, U. S. P.
<i>Strychnine</i>	Strychninae, U. S. P.
<i>Strychnine Acetate, Solution of</i>	Liquor Strychninae Acetatis, N. F.
<i>Strychnine Glycerinophosphate</i>	Strychninae Glycerophosphas, N. F.
<i>Strychnine Glycerophosphate</i>	Strychninae Glycerophosphas, N. F.
<i>Strychnine Nitrate</i>	Strychninae Nitras, U. S. P.
<i>Strychnine Sulphate</i>	Strychninae Sulphas, U. S. P.
<i>Strychnine Valerate</i>	Strychninae Valeras, N. F.
<i>Strychnine Valerate, Elixir of</i>	Elixir Strychninae Valeratis.
<i>Strychninum</i>	Strychnina, U. S. P.
<i>Strychninum Nitricum</i>	Strychninae Nitras, U. S. P.
<i>Strychninum Sulfuricum</i>	Strychninae Sulphas, U. S. P.
<i>Styptic Collodion</i>	Collodium Stypticum, N. F.
<i>Styptic Cotton</i>	Gossypium Stypticum, N. F.
<i>Styrax Liquidus</i>	Styrax, U. S. P.
<i>Subchloride of Mercury</i>	Hydrargyri Chloridum Mite, U. S. P.
<i>Subgallas Bismuthicus</i>	Bismuthi Subgallas, U. S. P.
<i>Sublimed Sulphur</i>	Sulphur Sublimatum, U. S. P.
<i>Subnitras Bismuthicus</i>	Bismuthi Subnitras, U. S. P.
<i>Subsalicylas Bismuthicus</i>	Bismuthi Subsalicylas, U. S. P.
<i>Succus Limettae cum Pepaino</i> , N. F. III.	Succus Citri et Pepsinum, N. F.
<i>Sucrose</i>	Saccharum, U. S. P.
<i>Suet, Benzoinated</i>	Sevum Benzoinatum, N. F.
<i>Suet, Prepared</i>	Sevum Præparatum, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Sugar</i>	<i>Saccharum</i> , U. S. P.
<i>Sugar of Milk</i>	<i>Saccharum Lactis</i> , U. S. P.
<i>Sugar of Lead</i>	<i>Plumbi Acetas</i> , U. S. P.
<i>Sulfas Aluminico-Kalicus</i>	<i>Alumen</i> , U. S. P.
<i>Sulfas Aluminico-Kalicus Ustus</i>	<i>Alumen Exsiccatum</i> , U. S. P.
<i>Sulfas Atropicus</i>	<i>Atropinæ Sulphas</i> , U. S. P.
<i>Sulfas Chinicus</i>	<i>Quininæ Sulphas</i> , U. S. P.
<i>Sulfas Cupricus</i>	<i>Cupri Sulphas</i> , U. S. P.
<i>Sulfas Ferrosus</i>	<i>Ferri Sulphas</i> , U. S. P.
<i>Sulfas Ferrosus Siccatis</i>	<i>Ferri Sulphas Exsiccatas</i> , U. S. P.
<i>Sulfas Kalicus</i>	<i>Potassii Sulphas</i> , U. S. P.
<i>Sulfas Magnesicus</i>	<i>Magnesii Sulphas</i> , U. S. P.
<i>Sulfas Natricus</i>	<i>Sodii Sulphas</i> , U. S. P.
<i>Sulfas Spareticus</i>	<i>Sparteinae Sulphas</i> , U. S. P.
<i>Sulfonalum</i>	<i>Sulphonmethanum</i> , U. S. P.
<i>Sulfas Zincicus</i>	<i>Zinci Sulphas</i> , U. S. P.
<i>Sulfur Depuratum</i>	<i>Sulphur Lotum</i> , U. S. P.
<i>Sulfur Præcipitatum</i>	<i>Sulphur Præcipitatum</i> , U. S. P.
<i>Sulfur Sublimatum</i>	<i>Sulphur Sublimatum</i> , U. S. P.
<i>Sulphas Aluminicus</i>	<i>Alumini Sulphas</i> , N. F.
<i>Sulphonal</i>	<i>Sulphonmethanum</i> , U. S. P.
<i>Sulphonethylmethane</i>	<i>Sulphonethymmethanum</i> , U. S. P.
<i>Sulphonmethane</i>	<i>Sulphonmethanum</i> , U. S. P.
<i>Sulphur and Potassium Bitartrate, Trochisci Sulphuris et Potassii Bitartratis, Troches of.</i>	N. F.
<i>Sulphurated Animony</i>	<i>Antimonium Sulphuratum</i> , N. F.
<i>Sulphurated Lime</i>	<i>Calcii Sulphidum Crudum</i> , U. S. P.
<i>Sulphurated Lime, Solution of</i>	<i>Liquor Calcis Sulphuratæ</i> , N. F.
<i>Sulphurated Potassa</i>	<i>Potassæ Sulphurata</i> , U. S. P.
<i>Sulphurated Petrox.</i>	<i>Petroxolinum Sulphurata</i> , N. F.
<i>Sulphurated Petroxolin</i>	<i>Petroxolinum Sulphurata</i> , N. F.
<i>Sulphurated Zinc Paste</i>	<i>Pasta Zinci Sulphurata</i> , N. F.
<i>Sulphuric Acid</i>	<i>Acidum Sulphuricum</i> , U. S. P.
<i>Sulphuric Acid, Aromatic</i>	<i>Acidum Sulphuricum Aromaticum</i> , U. S. P.
<i>Sulphuric Acid, Diluted</i>	<i>Acidum Sulphuricum Dilutum</i> , U. S. P.
<i>Sulphuric Acid Mixture</i>	<i>Mistura Sulphurica Acida</i> , N. F. III.
<i>Sulphur Iodide</i>	<i>Sulphuris Iodidum</i> , N. F.
<i>Sulphur Ointment</i>	<i>Unguentum Sulphuris</i> , U. S. P.
<i>Sulphur Ointment, Alkaline</i>	<i>Unguentum Sulphuris Alkalinum</i> , N. F.
<i>Sulphur Ointment, Compound</i>	<i>Unguentum Sulphuris Compositum</i> , N. F.
<i>Sulphurous Acid</i>	<i>Acidum Sulphurosum</i> , U. S. P. VIII.
<i>Sulphur, Precipitated</i>	<i>Sulphur Præcipitatum</i> , U. S. P.
<i>Sulphur, Sublimed</i>	<i>Sulphur Sublimatum</i> , U. S. P.
<i>Sulphur, Washed</i>	<i>Sulphur Lotum</i> , U. S. P.
<i>Sumac Berries</i>	<i>Rhus Glabra</i> , N. F.
<i>Sumbul</i>	<i>Sumbul</i> , U. S. P.
<i>Sumbul, Extract of</i>	<i>Extractum Sumbul</i> , U. S. P.
<i>Sumbul, Fluidextract of</i>	<i>Fluidextractum Sumbul</i> , U. S. P.
<i>Sumbul, Tincture of</i>	<i>Tinctura Sumbul</i> , N. F.
<i>Sun Cholera Mixture</i>	<i>Mistura Opii et Rhei Composita</i> , N. F.
<i>Sundew</i>	<i>Drosera</i> , N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Supercarbonas Ammonicus.....	Ammonii Carbonas, U. S. P.
Suppositories.....	Suppositoria, U. S. P.
Suppositories of Boroglycerin.....	Suppositoria Boroglycerini, N. F.
Suppositories of Glycerin.....	Suppositoria Glycerini, U. S. P.
Suprarenals, Dried.....	Suprarenalum Siccum, U. S. P.
Sweet Almond.....	Amygdala Dulcis, U. S. P.
Sweet Grass.....	Triticum, U. S. P.
Sweet Orange Peel.....	Aurantii Dulcis Cortex, U. S. P.
Sweet Spirit of Nitre.....	Spiritus Ætheris Nitrosi, U. S. P.
Sweet Tincture of Rhubarb.....	Tinctura Rhei Dulcis, N. F.
Sydenham's Laudanum.....	Tinctura Opii Crocata, N. F.
Syrup.....	Syrupus, U. S. P.
Syrup of Acacia.....	Syrupus Acaciæ, U. S. P.
Syrup of Actæa Compound, N. F. III.....	Syrupus Cimicifugæ Compositus, N. F.
Syrup of Almond.....	Syrupus Amygdalæ, U. S. P. VIII.
Syrup of Althæa.....	Syrupus Althææ, N. F.
Syrup of Ammonium Hypophosphite.....	Syrupus Ammonii Hypophosphitis, N. F.
Syrup of Arsenate of Iron.....	Syrupus Ferri Arsenatis, N. F. III.
Syrup of Asarum, Compound.....	Syrupus Asari Compositus, N. F.
Syrup of Blackberry.....	Syrupus Rubi, N. F.
Syrup of Blackberry Fruit.....	Syrupus Rubi Fructi, N. F.
Syrup of Bloodroot.....	Syrupus Sanguinaræ, N. F.
Syrup of Bromide of Iron.....	Syrupus Ferri Bromidi, N. F. III.
Syrup of Buckthorn Berries.....	Syrupus Rhamni Cathartici, N. F.
Syrup of Calcium and Sodium Hypophosphites.....	Syrupus Calcii et Sodii Hypophosphitis, N. F.
Syrup of Calcium Hydrochlorophosphate.....	Syrupus Calcii Hydrochlorophosphatis, N. F.
Syrup of Calcium Hydroxide.....	Syrupus Calcis, U. S. P. VIII.
Syrup of Calcium Hypophosphite.....	Syrupus Calcii Hypophosphitis, N. F.
Syrup of Calcium Iodide.....	Syrupus Calcii Iodidi, N. F.
Syrup of Calcium Lactophosphate.....	Syrupus Calcii Lactophosphatis, U. S. P.
Syrup of Calcium Lactophosphate with Iron.....	Syrupus Calcii Lactophosphatis et Ferri, N. F.
Syrup of Chondrus, Compound.....	Syrupus Chondri Compositus, N. F. III.
Syrup of Cimicifuga, Compound.....	Syrupus Cimicifugæ Compositus, N. F.
Syrup of Cinnamon.....	Syrupus Cinnamomi, N. F.
Syrup of Citric Acid.....	Syrupus Acidi Citrici, U. S. P.
Syrup of Citro-Iodide of Iron.....	Syrupus Ferri Citro-Iodidi, N. F. III.
Syrup of Codeine.....	Syrupus Codeinæ, N. F.
Syrup of Coffee.....	Syrupus Caffææ, N. F. III.
Syrup of Dover's Powder.....	Syrupus Ipecacuanhæ et Opii, N. F.
Syrup of Eriodictyon, Aromatic.....	Syrupus Eriodictyi Aromaticus, N. F.
Syrup of Ferric Hypophosphite.....	Syrupus Ferri Hypophosphitis, N. F.
Syrupus Ferri Iodati, P. I.....	Syrupus Ferri Iodidi, U. S. P.
Syrupus Ferri Oxydati Solubilis.....	Syrupus Ferri Saccharati Solubilis, N. F.
Syrup of Ferrous Chloride.....	Syrupus Ferri Protochloridi, N. F.
Syrup of Ferrous Iodide.....	Syrupus Ferri Iodidi, U. S. P.
Syrup of Figs, Compound.....	Syrupus Ficorum Compositus, N. F.
Syrup of Garlic.....	Syrupus Allii, N. F.
Syrup of Ginger.....	Syrupus Zingiberis, U. S. P.
Syrupy Glucose.....	Glucosum, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Syrup of Glycyrrhiza</i>	Syrupus Glycyrrhizæ, N. F.
<i>Syrup of Hydriodic Acid</i>	Syrupus Acidi Hydriodici, U. S. P.
<i>Syrup of Hydrochlorophosphates, N. F.,</i> III.	Syrupus Phosphatum cum Quinina et Strychnina, N. F.
<i>Syrup of Hypophosphites</i>	Syrupus Hypophosphitum, U. S. P.
<i>Syrup of Hypophosphites, Compound</i>	Syrupus Hypophosphitum Compositum, N. F.
<i>Syrup of Iodo-Tannin</i>	Syrupus Iodotannicus, N. F.
<i>Syrup of Ipecac</i>	Syrupus Ipecacuanhæ, U. S. P.
<i>Syrup of Ipecac and Opium</i>	Syrupus Ipecacuanhæ et Opii, N. F.
<i>Syrup of Iron and Manganese Iodides</i>	Syrupus Ferri et Mangani Iodidi, N. F.
<i>Syrup of Iron Lactophosphate</i>	Syrupus Ferri Lactophosphatis, N. F.
<i>Syrup of Krameria</i>	Syrupus Krameriæ, N. F.
<i>Syrup of Lactophosphate of Lime with</i> Iron.	Syrupus Calcii Lactophosphatis et Ferri N. F.
<i>Syrup of Lactucarium</i>	Syrupus Lactucarii, U. S. P.
<i>Syrup of Licorice</i>	Syrupus Glycyrrhizæ, N. F.
<i>Syrup of Lime</i>	Syrupus Calcis, U. S. P. VIII.
<i>Syrup of Manna</i>	Syrupus Mannæ, N. F.
<i>Syrup of Marshmallow</i>	Syrupus Althææ, N. F.
<i>Syrup of Morphine and Acacia</i>	Syrupus Morphinæ et Acaciæ, N. F.
<i>Syrup of Morphine, Compound</i>	Syrupus Morphinæ Compositus, N. F. III.
<i>Syrup of Morphine Sulphate</i>	Syrupus Morphinæ Sulphatis, N. F.
<i>Syrup of Orange</i>	Syrupus Aurantii, U. S. P.
<i>Syrup of Orange Flowers</i>	Syrupus Aurantii Florum, U. S. P.
<i>Syrup of Phosphates, Compound</i>	Syrupus Phosphatum Compositus, N. F.
<i>Syrup of Phosphates with Quinine and</i> Strychnine.	Syrupus Phosphatum cum Quinina et Strychnina, N. F.
<i>Syrup of Poppy Capsules</i>	Syrupus Papaveris, N. F.
<i>Syrup of Protochloride of Iron</i>	Syrupus Ferri Protochloridi, N. F.
<i>Syrup of Quinidine</i>	Syrupus Quinidinæ, N. F.
<i>Syrup of Raspberry</i>	Syrupus Rubi Fructi, N. F.
<i>Syrup of Rhamnus Catharticus</i>	Syrupus Rhamni Cathartici, N. F.
<i>Syrup of Rhubarb</i>	Syrupus Rhei, U. S. P.
<i>Syrup of Rhubarb, Aromatic</i>	Syrupus Rhei Aromaticus, U. S. P.
<i>Syrup of Rose</i>	Syrupus Rosæ, N. F.
<i>Syrup of Rubus</i>	Syrupus Rubi, N. F.
<i>Syrup of Saccharated Oxide of Iron</i>	Syrupus Ferri Saccharati Solubilis, N. F.
<i>Syrup of Sanguinaria</i>	Syrupus Sanguinariæ, N. F.
<i>Syrup of Sarsaparilla, Compound</i>	Syrupus Sarsaparillæ Compositus, U. S. P.
<i>Syrup of Senna, Aromatic</i>	Syrupus Sennæ Aromaticus, N. F.
<i>Syrup of Senna, Compound</i>	Syrupus Sennæ Compositus, N. F.
<i>Syrup of Sodium Hypophosphite</i>	Syrupus Sodii Hypophosphitis, N. F.
<i>Syrup of Soluble Oxide of Iron</i>	Syrupus Ferri Saccharati Solubilis, N. F.
<i>Syrup of Soluble Saccharated Iron</i>	Syrupus Ferri Saccharati Solubilis, N. F.
<i>Syrup of Senega</i>	Syrupus Senegæ, U. S. P.
<i>Syrup of Senna</i>	Syrupus Sennæ, U. S. P.
<i>Syrupus Spinæ Cervinæ</i>	Syrupus Rhamni Cathartici, N. F.
<i>Syrup of Squill</i>	Syrupus Scillæ, U. S. P.
<i>Syrup of Squill, Compound</i>	Syrupus Scillæ Compositus, U. S. P.
<i>Syrup of Stillingia, Compound</i>	Syrupus Stillingiæ Compositus, N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Syrup of Tar</i>	<i>Syrupus Picis Liquidæ</i> , U. S. P.
<i>Syrup of the Bromides</i>	<i>Syrupus Bromidorum</i> , N. F.
<i>Syrup of the Phosphates, Compound</i>	<i>Syrupus Phosphatum Compositus</i> , N. F.
<i>Syrup of the Phosphates of Iron, Quinine and Strychnine.</i>	<i>Syrupus Ferri, Quininæ et Strychninæ Phosphatum</i> , N. F.
<i>Syrup of Tolu</i>	<i>Syrupus Tolutanus</i> , U. S. P.
<i>Syrup of White Pine, Compound</i>	<i>Syrupus Pini Strobi Compositus</i> , N. F.
<i>Syrup of White Pine with Morphine, Compound.</i>	<i>Syrupus Pini Strobi Compositus cum Morphina</i> , N. F.
<i>Syrup of Wild Cherry</i>	<i>Syrupus Pruni Virginianæ</i> , U. S. P.
<i>Syrupus Actææ Compositus</i> , N. F. III.	<i>Syrupus Cimicifugæ Compositus</i> , N. F.
<i>Syrupus Corrigenæ</i>	<i>Syrupus Eriodictyi Aromaticus</i> , N. F.
<i>Syrupus Calcii Chlorhydrophosphatis</i> , N. F. III.	<i>Syrupus Calcii Hydrochlorophosphatis</i> , N. F.
<i>Syrupus Calcii Lactophosphatis cum Ferro</i> , N. F. III.	<i>Syrupus Calcii Lactophosphatis et Ferri</i> , N. F.
<i>Syrupus Hydrochlorophosphatum</i> , N. F. III.	<i>Syrupus Phosphatum cum Quinina et Strychnina</i> , N. F.
<i>Syrupus Jodeti Ferrosi</i>	<i>Syrupus Ferri Iodidi</i> , U. S. P.
<i>Syrupus Pectoralis</i> , N. F. III.	<i>Syrupus Morphinæ et Acaciæ</i> , N. F.
<i>Syrupus Pini Strobi Compositus</i> , N. F. III.	<i>Syrupus Pini Strobi Compositus cum Morphina</i> , N. F.
<i>Syrupus Rhei et Potassii Compositus</i> , U. S. P.	<i>Mistura Rhei Alkalina</i> , N. F.
<i>Syrups</i>	<i>Syrupi</i> , N. F.
Tablets of Corrosive Mercuric Chloride, Poison.	Toxitebellæ Hydrargyri Chloridi Corrosivi , U. S. P.
<i>Talc</i>	<i>Talcum</i> , U. S. P., VIII.
<i>Talc, Boro-Salicylated Powder of</i>	<i>Pulvis Talci Boro-Salicylatis</i> , N. F.
<i>Talc, Compound Powder of</i>	<i>Pulvis Talci Compositus</i> , N. F.
<i>Talc, Purified</i>	<i>Talcum Purificatum</i> , U. S. P.
<i>Tamarind</i>	<i>Tamarindus</i> , N. F.
<i>Tannic Acid</i>	<i>Acidum Tannicum</i> , U. S. P.
<i>Tannic Acid, Glycerite of</i>	<i>Glyceritum Acidi Tannici</i> , U. S. P.
<i>Tannic Acid, Ointment of</i>	<i>Unguentum Acidi Tannici</i> , U. S. P.
<i>Tannic Acid, Troches of</i>	<i>Trochisci Acidi Tannici</i> , U. S. P.
<i>Tar</i>	<i>Pix Liquida</i> , U. S. P.
<i>Tar, Alkaline Solution of</i>	<i>Liquor Picis Alkalinus</i> , N. F.
<i>Taraxacum</i>	<i>Taraxacum</i> , U. S. P.
<i>Taraxacum, Compound Elixir of</i>	<i>Elixir Taraxaci Compositum</i> , N. F.
<i>Taraxacum, Extract of</i>	<i>Extractum Taraxaci</i> , U. S. P.
<i>Taraxacum, Fluidextract of</i>	<i>Fluidextractum Taraxaci</i> , U. S. P.
<i>Tar, Compound Elixir of</i>	<i>Elixir Picis Compositum</i> , N. F.
<i>Tar, Glycerite of</i>	<i>Glyceritum Picis Liquidæ</i> , N. F.
<i>Tar Mixture</i>	<i>Mistura Olei Picis</i> , N. F.
<i>Tar Ointment</i>	<i>Unguentum Picis Liquidæ</i> , U. S. P.
<i>Tar Ointment, Compound</i>	<i>Unguentum Picis Compositum</i> , N. F.
<i>Tar Petrox</i>	<i>Petroxolinum Picis</i> , N. F.
<i>Tar Petrozolin</i>	<i>Petroxolinum Picis</i> , N. F.
<i>Tar, Rectified Oil of</i>	<i>Oleum Picis Liquidæ Rectificatum</i> , U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Tar, Syrup of.....	Syrupus Picis Liquidæ, U. S. P.
Tartar Emetic.....	Antimonii et Potassii Tartras, U. S. P.
<i>Tartaric Acid</i>	Acidum Tartaricum, U. S. P.
Tartaric Acid, Saccharated.....	Acidum Tartaricum Saccharatum, N. F. III.
Tartarus Stibiatus.....	Antimonii et Potassii Tartras, U. S. P.
Tartras Natrico-Kalicus.....	Potassii et Sodii Tartras, U. S. P.
Tartras Stibico-Kalicus.....	Antimonii et Potassii Tartras, U. S. P.
Tartrated Antimony.....	Antimonii et Potassii Tartras, U. S. P.
Tar, Wine of.....	Vinum Picis, N. F.
Tasteless Syrup of Iodide of Iron.....	Syrupus Ferri Citro-Iodidi, N. F. III.
Tasteless Tincture of Ferric Chloride....	Tinctura Ferri Citro-Chloridi, N. F.
Tasteless Tincture of Iron.....	Tinctura Ferri Citro-Chloridi, N. F.
Teel Oil.....	Oleum Sesami, U. S. P.
<i>Terebene</i>	Terebenum, U. S. P.
<i>Terpin Hydrate</i>	Terpini Hydras, U. S. P.
Terpin Hydrate, Elixir of.....	Elixir Terpini Hydratis, N. F.
Terpin Hydrate and Codeine, Elixir of...	Elixir Terpini Hydratis et Codeina, N. F.
Terpin Hydrate and Diacetylmorphine, Elixir of.....	Elixir Terpini Hydratis et Diacetylmorphinæ, N. F.
Terpinum Hydratum.....	Terpini Hydras, U. S. P.
Tetanus Antitoxin.....	Serum Antitetanicum, U. S. P.
Tetanus Antitoxin Globulins.....	Serum Antitetanicum Purificatum, U. S. P.
Texas Snakeroot.....	Serpentaria, U. S. P.
Theine.....	Caffeina, U. S. P.
Theobroma, Oil of.....	Oleum Theobromatis, U. S. P.
<i>Theobromine Sodio-Salicylate</i>	Theobrominæ Sodio-Salicylas, U. S. P.
<i>Theophylline</i>	Theophyllina, U. S. P.
Thielmann's Diarrhoea Mixture.....	Mistura Contra Diarrhoeam, N. F. III.
Thomsonian Number Six.....	Tinctura Capsici et Myrrhæ, N. F.
Thompson's Solution of Phosphorus....	Liquor Phosphori, N. F.
Thoroughwort.....	Eupatorium, N. F.
Three Bromides, Elixir of.....	Elixir Trium Bromidorum, N. F.
<i>Thuja</i>	Thuja, N. F.
Thuja, Fluidextract of.....	Fluidextractum Thuje, N. F.
<i>Thyme</i>	Thymus, N. F.
Thyme, Fluidextract of.....	Fluidextractum Thymi, N. F.
Thyme Oil.....	Oleum Thymi, U. S. P.
<i>Thymol</i>	Thymol, U. S. P.
<i>Thymol Iodide</i>	Thymolis Iodidum, U. S. P.
<i>Thymol Spray</i>	Nebula Thymolis, N. F.
Thyroids, Dried.....	Thyroideum Siccum, U. S. P.
Tinctura Aconiti, P. I.....	Tinctura Aconiti, U. S. P.
Tinctura Asae Foetidae.....	Tinctura Asafetidae, U. S. P.
Tinctura Belladonnae.....	Tinctura Belladonnae Foliorum, U. S. P.
Tinctura Cantharidis, P. I.....	Tinctura Cantharidis, U. S. P.
Tinctura Chinae.....	Tinctura Cinchonæ, U. S. P.
Tinctura Chinae Composita.....	Tinctura Cinchonæ Composita, U. S. P.
Tinctura Colchici, P. I.....	Tinctura Colchici Seminis, U. S. P.
Tinctura Coto, N. F. III.....	Tinctura Paracoto, N. F.
Tinctura Digitalis, P. I.....	Tinctura Digitalis, U. S. P.
Tinctura Herbarum Recentium, U. S. P. VIII.	Tincturæ Medicamentorum Recentium, N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Tinctura Hyoscyami, P. I.....	Tinctura Hyoscyami, U. S. P.
Tinctura Jodi.....	Tinctura Iodi, U. S. P.
Tinctura Lobeliae, P. I.....	Tinctura Lobeliae, U. S. P.
Tinctura Opii, P. I.....	Tinctura Opii, U. S. F.
Tinctura Opii Crocata, P. I.....	Tinctura Opii Crocata, N. F.
Tinctura Strychni, P. I.....	Tinctura Nucis Vomicae, U. S. P.
Tincture, Antiperiodic.....	Tinctura Antiperiodica, N. F.
Tincture, Antiperiodic without Aloe.....	Tinctura Antiperiodica sine Aloe, N. F.
Tincture, Bitter.....	Tinctura Amara, N. F.
Tincture of Aconite.....	Tinctura Aconiti, U. S. P.
Tincture of Aloe.....	Tinctura Aloes, U. S. P.
Tincture of Aloe and Myrrh.....	Tinctura Aloes et Myrrhae, N. F.
Tincture of Arnica.....	Tinctura Arnicae, U. S. P.
Tincture of Arnica Root.....	Tinctura Arnicae Radicis, N. F. III.
Tincture, Aromatic.....	Tinctura Aromatica, N. F.
Tincture of Asafetida.....	Tinctura Asafoetidae, U. S. P.
Tincture of Belladonna Leaves.....	Tinctura Belladonnae Foliorum, U. S. P.
Tincture of Benzoin.....	Tinctura Benzoini, U. S. P.
Tincture of Benzoin, Compound.....	Tinctura Benzoini Composita, U. S. P.
Tincture of Bitter Orange Peel.....	Tinctura Aurantii Amari, U. S. P.
Tincture of Bloodroot.....	Tinctura Sanguinariae, U. S. P.
Tincture of Bryonia.....	Tinctura Bryoniae, N. F.
Tincture of Cactus Grandiflorus.....	Tinctura Cacti Grandiflori, N. F.
Tincture of Calabar Bean.....	Tinctura Physostigmatis, U. S. P.
Tincture of Calendula.....	Tinctura Calendulae, N. F.
Tincture of Calumba.....	Tinctura Calumbae, U. S. P.
Tincture of Cannabis.....	Tinctura Cannabis, U. S. P.
Tincture of Cannabis Indica, U. S. P.	Tinctura Cannabis, U. S. P.

VIII.

Tincture of Cantharides.....	Tinctura Cantharidis, U. S. P.
Tincture of Capsicum.....	Tinctura Capsici, U. S. P.
Tincture of Capsicum and Myrrh.....	Tinctura Capsici et Myrrhae, N. F.
Tincture of Caramel.....	Tinctura Caramellis, N. F.
Tincture of Cardamom.....	Tinctura Cardamomi, U. S. P.
Tincture of Chirata.....	Tinctura Chiratae, N. F. III.
Tincture of Cimicifuga.....	Tinctura Cimicifugae, N. F.
Tincture of Cinchona.....	Tinctura Cinchonae, U. S. P.
Tincture of Cinchona, Compound.....	Tinctura Cinchonae Composita, U. S. P.
Tincture of Cinchona, Detannated.....	Tinctura Cinchonae Detannata, N. F. III.
Tincture of Cinnamon.....	Tinctura Cinnamomi, U. S. P.
Tincture of Cocculus Indicus.....	Tinctura Cocculi Indici, N. F.
Tincture of Colchicum Seed.....	Tinctura Colchici Seminis, U. S. P.
Tincture of Conium.....	Tinctura Conii, N. F. III.
Tincture of Coto, N. F. III.....	Tinctura Paracoto, N. F.
Tincture of Cresol, Saponated.....	Tinctura Cresoli Saponata, N. F. III.
Tincture of Crude Malate of Iron.....	Tinctura Ferri Pomata, N. F.
Tincture of Cubeb.....	Tinctura Cubebae, N. F.
Tincture of Cudbear.....	Tinctura Persionis, N. F.
Tincture of Cudbear, Compound.....	Tinctura Persionis Composita, N. F.
Tincture of Deodorized Opium.....	Tinctura Opii Deodorati, U. S. P.
Tincture of Digitalis.....	Tinctura Digitalis, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Tincture of Dover's Powder.....	Tinctura Ipecacuanhæ et Opii, N. F.
Tincture of Ergot, Ammoniated.....	Tinctura Ergotæ, Ammoniata, N. F.
Tincture of Ferrated Extract of Apples....	Tinctura Ferri Pomata, N. F.
Tincture of Ferric Chloride.....	Tinctura Ferri Chloridi, U. S. P.
Tincture of Ferric Chloride, Ethereal....	Tinctura Ferri Chloridi Ætherea, N. F.
Tincture of Ferric Citro-Chloride.....	Tinctura Ferri Citro-Chloridi, N. F.
Tincture of Ferrous Malates, Crude.....	Tinctura Ferri Pomata, N. F.
Tincture of Fish Berry.....	Tinctura Cocculi Indici, N. F.
Tincture of Fresh Drugs.....	Tincturæ Medicamentorum Recentium, N. F.
Tincture of Gambir, Compound.....	Tinctura Gambir Composita, U. S. P.
Tincture of Gelsemium.....	Tinctura Gelsemii, U. S. P.
Tincture of Gentian, Compound.....	Tinctura Gentianæ Composita, U. S. P.
Tincture of Ginger.....	Tinctura Zingiberis, U. S. P.
Tincture of Golden Seal.....	Tinctura Hydrastis, U. S. P.
Tincture of Green Hellebore.....	Tinctura Veratri Viridis, U. S. P.
Tincture of Green Soap.....	Linimentum Saponis Mollis, U. S. P.
Tincture of Green Soap, Compound.....	Tinctura Saponis Viridis Composita, N. F.

III.

Tincture of Guaiac.....	Tinctura Guaiaci, U. S. P.
Tincture of Guaiac, Ammoniated.....	Tinctura Guaiaci Ammoniata, U. S. P.
Tincture of Guaiac, Compound.....	Tinctura Guaiaci Composita, N. F.
Tincture of Henbane.....	Tinctura Hyoscyami, U. S. P.
Tincture of Hops.....	Tinctura Humuli, N. F.
Tincture of Hydrastis.....	Tinctura Hydrastis, U. S. P.
Tincture of Hyoscyamus.....	Tinctura Hyoscyami, U. S. P.
Tincture of Ignatia.....	Tinctura Ignatiæ, N. F.
Tincture of Iodine.....	Tinctura Iodi, U. S. P.
Tincture of Iodine, Decolorized.....	Tinctura Iodi Decolorata, N. F.
Tincture of Iodine, Stronger.....	Tinctura Iodi Fortior, N. F.
Tincturæ of Ipecac and Opium.....	Tinctura Ipecacuanhæ et Opii, N. F.
Tincture of Jalap.....	Tinctura Jalapæ, N. F.
Tincture of Jalap, Compound.....	Tinctura Jalapæ Composita, N. F.
Tincture of Jamaica Ginger.....	Tinctura Zingiberis, U. S. P.
Tincture of Kino.....	Tinctura Kino, U. S. P.
Tincture of Kino and Opium, Compound.....	Tinctura Kino et Opii Composita, N. F.
Tincture of Kino Compound, N. F. III.....	Tinctura Kino et Opii Composita, N. F.
Tincture of Krameria.....	Tinctura Krameriz, N. F.
Tincture of Lactucarium.....	Tinctura Lactucarii, U. S. P.
Tincture of Larkspur.....	Tinctura Delphinii, N. F.
Tincture of Lemon Peel.....	Tinctura Limonis Corticis, U. S. P.
Tincture of Lobelia.....	Tinctura Lobeliæ, U. S. P.
Tincture of Matico.....	Tinctura Matico, N. F. III.
Tincture of Musk.....	Tinctura Moschi, U. S. P.
Tincture of Myrrh.....	Tinctura Myrrhæ, U. S. P.
Tincture of Night Blooming Cereus.....	Tinctura Cacti Grandiflori, N. F.
Tincture of Nutgall.....	Tinctura Gallæ, N. F.
Tincture of Nux Vomica.....	Tinctura Nucis Vomiz, U. S. P.
Tincture of Opium.....	Tinctura Opii, U. S. P.
Tincture of Opium, Camphorated.....	Tinctura Opii Camphorata, U. S. P.
Tincture of Opium, Deodorized.....	Tinctura Opii Deodorati, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Tincture of Opium with Saffron</i>	<i>Tinctura Opii Crocata</i> , N. F.
<i>Tincture of Paracoto</i>	<i>Tinctura Paracoto</i> , N. F.
<i>Tincture of Passion Flower</i>	<i>Tinctura Passifloræ</i> , N. F.
<i>Tincture of Pellitory</i>	<i>Tinctura Pyrethri</i> , U. S. P.
<i>Tincture of Phosphorus</i>	<i>Spiritus Phosphori</i> , N. F. III.
<i>Tincture of Physostigma</i>	<i>Tinctura Physostigmatiæ</i> , U. S. P.
<i>Tincture of Pimpinella</i>	<i>Tinctura Pimpinellæ</i> , N. F.
<i>Tincture of Poppy</i>	<i>Tinctura Papaveris</i> , N. F. III.
<i>Tincture of Pulsatilla</i>	<i>Tinctura Pulsatillæ</i> , N. F.
<i>Tincture of Pyrethrum</i>	<i>Tinctura Pyrethri</i> , U. S. P.
<i>Tincture of Quillaja</i>	<i>Tinctura Quillajæ</i> , N. F.
<i>Tincture of Quassia</i>	<i>Tinctura Quassiæ</i> , U. S. P.
<i>Tincture of Rhubarb</i>	<i>Tinctura Rhei</i> , U. S. P.
<i>Tincture of Rhubarb and Gentian</i>	<i>Tinctura Rhei et Gentianæ</i> , N. F.
<i>Tincture of Rhubarb, Aqueous</i>	<i>Tinctura Rhei Aquosa</i> , N. F.
<i>Tincture of Rhubarb, Aromatic</i>	<i>Tinctura Rhei Aromatica</i> , U. S. P.
<i>Tincture of Rhubarb, Sweet</i>	<i>Tinctura Rhei Dulcis</i> , N. F.
<i>Tincture of Rhubarb, Vinous</i>	<i>Tinctura Rhei Vinosa</i> , N. F. III.
<i>Tincture of Saffron</i>	<i>Tinctura Croci</i> , N. F.
<i>Tincture of Sanguinaria</i>	<i>Tinctura Sanguinariæ</i> , U. S. P.
<i>Tincture of Saw Palmetto and Santal</i>	<i>Tinctura Sabals et Santali</i> , N. F.
<i>Tincture of Serpentaria</i>	<i>Tinctura Serpentariæ</i> , N. F.
<i>Tincture of Squill</i>	<i>Tinctura Scillæ</i> , U. S. P.
<i>Tincture of Stramonium</i>	<i>Tinctura Stramonii</i> , U. S. P.
<i>Tincture of Stramonium Seed</i>	<i>Tinctura Stramonii Seminis</i> , N. F.
<i>Tincture of Strophanthus</i>	<i>Tinctura Strophamthi</i> , U. S. P.
<i>Tincture of Sumbul</i>	<i>Tinctura Sumbul</i> , N. F.
<i>Tincture of Sweet Orange Peel</i>	<i>Tinctura Aurantii Dulcis</i> , U. S. P.
<i>Tincture of Tolu</i>	<i>Tinctura Tolutana</i> , U. S. P.
<i>Tincture of Tolu, Ethereal</i>	<i>Tinctura Tolutana Ætherea</i> , N. F. III.
<i>Tincture of Tolu, Soluble</i>	<i>Tinctura Tolutana Solubilis</i> , N. F. III.
<i>Tincture of Valerian</i>	<i>Tinctura Valerianæ</i> , U. S. P.
<i>Tincture of Valerian, Ammoniated</i>	<i>Tinctura Valerianæ Ammoniata</i> , U. S. P.
<i>Tincture of Vanilla</i>	<i>Tinctura Vanillæ</i> , N. F.
<i>Tincture of Vanillin, Compound</i>	<i>Tinctura Vanillini Composita</i> , N. F. III.
<i>Tincture of Veratrum Viride</i>	<i>Tinctura Veratri Viridis</i> , U. S. P.
<i>Tincture of Viburnum, Compound</i>	<i>Tinctura Viburni Opuli Composita</i> , N. F.
<i>Tincture of Zedoary, Bitter</i>	<i>Tinctura Zedoariæ, Amaræ</i> , N. F.
<i>Tincture, Pectoral</i>	<i>Tinctura Pectoralis</i> , N. F.
<i>Tinctures</i>	<i>Tincturæ</i> , U. S. P.
<i>Tinctures, Ethereal</i>	<i>Tincturæ Ætherææ</i> , N. F.
<i>Tolu, Balsam of</i>	<i>Balsamum Tolutanum</i> , U. S. P.
<i>Tolu, Ethereal Tincture of</i>	<i>Tinctura Tolutana Ætherea</i> , N. F.
<i>Tolu, Soluble Tincture of</i>	<i>Tinctura Tolutana, Solubilis</i> , N. F. III.
<i>Tolu, Syrup of</i>	<i>Syrupus Tolutanus</i> , U. S. P.
<i>Tolu, Tincture of</i>	<i>Tinctura Tolutana</i> , U. S. P.
<i>Tragacanth</i>	<i>Tragacantha</i> , U. S. P.
<i>Tragacanth, Glycerite of</i>	<i>Glyceritum Tragacanthæ</i> , N. F.
<i>Tranquillaus, Balsamum</i>	<i>Oleum Hyocyami Compositum</i> , N. F.
<i>Traumatism Balsam</i>	<i>Balsamum Traumaticum</i> , N. F. III.
<i>Trichloracetic Acid</i>	<i>Acidum Trichloraceticum</i> , U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Trifolium</i>	Trifolium, N. F.
Trifolium, Fluidextract of.....	Fluidextractum Trifolii, N. F.
Trihydroxybenzene.....	Pyrogallol, U. S. P.
Trillium, Fluidextract of.....	Fluidextractum Trilli, N. F.
Trinitrophenol.....	Trinitrophenol, U. S. P.
Trional.....	Sulphonethylmethanum, U. S. P.
Trionalum.....	Sulphonethylmethanum, U. S. P.
Trioxymethylenum.....	Paraformaldehydum, U. S. P.
Triplex Pills.....	Pilulæ Aloes Hydrargyri et Podophylli, N. F.
Triticum.....	Triticum, U. S. P.
Triticum, Fluidextract of.....	Fluidextractum Triticum, U. S. P.
Trituration of <i>Elaterin</i>	Trituratio <i>Elaterini</i> , U. S. P.
<i>Triturations</i>	Triturationes, U. S. P.
<i>Troches of Ammonium Chloride</i>	Trochisci Ammonii Chloridi, U. S. P.
<i>Troches of Catechu</i> , N. F. III.....	Trochisci Gambir, N. F.
<i>Troches of Chalk</i>	Trochisci Cretæ, N. F. III.
<i>Troches of Charcoal</i>	Trochisci Carbonis Ligni, N. F.
<i>Troches of Cube</i>	Trochisci Cubebæ, U. S. P.
<i>Troches of Elm</i>	Trochisci Ulmi, N. F.
<i>Troches of Gambir</i>	Trochisci Gambir, N. F.
<i>Troches of Ginger</i>	Trochisci Zingiberis, N. F. III.
<i>Troches of Glycyrrhiza and Opium</i>	Trochisci Glycyrrhizæ et Opii, U. S. P.
VIII.	
<i>Troches of Ipecac</i>	Trochisci Ipecacuanhæ, N. F. III.
<i>Troches of Iron</i>	Trochisci Ferri, N. F. III.
<i>Troches of Krameria</i>	Trochisci Kramerizæ, U. S. P. VIII.
<i>Troches of Magnesia</i>	Trochisci Magnesizæ, N. F. III.
<i>Troches of Morphine and Ipecac</i>	Trochisci Morphinæ et Ipecacuanhæ, N. F.
III.	
<i>Troches of Peppermint</i>	Trochisci Menthæ Piperitæ, N. F.
<i>Troches of Phenolphthalein</i>	Trochisci Phenolphthaleini, N. F.
<i>Troches of Potassium Chlorate</i>	Trochisci Potassii Chloratis, U. S. P.
<i>Troches of Quinine Tannate</i>	Trochisci Quininæ Tannatis, N. F.
<i>Troches of Santonin</i>	Trochisci Santonini, N. F.
<i>Troches of Santonin and Calomel</i>	Trochisci Santonini Compositi, N. F.
<i>Troches of Sodium Bicarbonate</i>	Trochisci Sodii Bicarbonatis, U. S. P.
<i>Troches of Sodium Santoninate</i>	Trochisci Sodii Santoninatis, N. F. III.
<i>Troches of Sulphur and Cream of Tartar</i>	Trochisci Sulphuris et Potassii Bitartratis, N. F.
<i>Troches of Sulphur and Potassium Bitartrate</i>	Trochisci Sulphuris et Potassii Bitartratis, N. F.
<i>Troches of Tannic Acid</i>	Trochisci Acidi Tannici, U. S. P.
<i>Tubera Aconiti</i> , P. I.....	Aconitum, U. S. P.
<i>Tubera Jalapæ</i>	Jalapa, U. S. P.
<i>Turkey Corn</i>	Corydalis, N. F.
<i>Turlington's Balsam</i>	Balsamum Traumaticum, N. F. III.
<i>Turnera</i> , Elixir of.....	Elixir Turnere, N. F. III.
<i>Turner's Cereate</i>	Unguentum Calaminæ, N. F.
<i>Turpentine</i>	Terebinthina, N. F.
<i>Turpentine Liniment</i>	Linimentum Terebinthinæ, U. S. P.
<i>Turpentine Liniment, Acetic</i>	Linimentum Terebinthinæ Aceticum, N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Turpentine Oil.....	Oleum Terebinthinæ, U. S. P.
Turpeth Mineral.....	Hydrargyri Subsulphas Flavus, N. F. III.
Tussilago Leaves.....	Farfara, N. F.
Typical Emulsions.....	Emulsa Symbolica, N. F. III.
Unguentum Calaminare.....	Unguentum Calaminæ, N. F.
Unguentum Cantharidum.....	Ceratum Cantharidis, U. S. P.
Unguentum Cetacei.....	Unguentum Aquæ Rosæ, U. S. P.
Unguentum Creosoti Salicylatum Extensum.	Mulla Creosoti Salicylata, N. F.
Unguentum Glycerini.....	Glyceritum Amyli, U. S. P.
Unguentum Hydrargyri Album.....	Unguentum Hydrargyri Ammoniatum, U. S. P.
Unguentum Hydrargyri Chloridi.....	Mulla Hydrargyri Chloridi Corrosivi, N. F.
Unguentum Matris.....	Unguentum Fuscum, N. F.
Unguentum Salicylatum Extensum,	Mulla Acidi Salicylici, N. F.
N. F. III.	
Unguentum Simplex.....	Unguentum, U. S. P.
Unguentum Sulfuratum.....	Unguentum Sulphuris, U. S. P.
Unguentum Zinci.....	Unguentum Zinci Oxidi, U. S. P.
Unguentum Zinci Carbonatis Impuri.....	Unguentum Calaminæ, N. F.
Unguentum Zinci Extensum, N. F. III.	Mulla Zinci, N. F.
Unicorn Root.....	Aletris, N. F.
Unna Pencils.....	Stili Dilubiles, N. F.
Unna's Ichthyol Paste.....	Pasta Ichthyoli, Unna, N. F. III.
Unna's Soft Zinc Paste.....	Pasta Zinci Mollis, N. F.
Unna's Sulphurated Zinc Paste.....	Pasta Zinci Sulphurata, N. F.
Uranium Nitrate.....	Uranii Nitras, U. S. P.
Urethane.....	Æthylis Carbamas, U. S. P.
Urisol.....	Hexamethylenamine, U. S. P.
Uritone.....	Hexamethylenamina, U. S. P.
Urotropin.....	Hexamethylenamine, U. S. P.
Urtica, Fluidextract of.....	Fluidextractum Urticæ, N. F. III.
Uva Ursi.....	Uva Ursi, U. S. P.
Uva Ursi, Extract of.....	Extractum Uvæ Ursi, N. F. III.
Uva Ursi, Fluidextract of.....	Fluidextractum Uvæ Ursi, U. S. P.
Vaccine Virus.....	Virus Vaccinicum, U. S. P.
Valerian.....	Valeriana, U. S. P.
Valerian, Ammoniated Tincture of.....	Tinctura Valerianæ Ammoniata, U. S. P.
Valerian, Fluidextract of.....	Fluidextractum Valerianæ, N. F.
Valerian, Tincture of.....	Tinctura Valerianæ, U. S. P.
Vallet's Mass.....	Massa Ferri Carbonatis, U. S. P.
Vanilla.....	Vanilla, N. F.
Vanilla Bean.....	Vanilla, N. F.
Vanilla, Tincture of.....	Tinctura Vanilla, N. F.
Vanillin.....	Vanillinum, U. S. P.
Vanillin, Compound Elixir of.....	Elixir Vanillini Compositum, N. F.
Vanillin, Compound Spirit of.....	Spiritus Vanillini Compositus, N. F.
Vanillin, Compound Tincture of.....	Tinctura Vanillini Composita, N. F. III.
Vaselin.....	Petrolatum, U. S. P.
Vaselinum.....	Petrolatum, U. S. P.
Vaselinum Album.....	Petrolatum Album, U. S. P.
Vegetable Cathartic Pills.....	Pilulæ Catharticæ Vegetabiles, N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

<i>Venice Turpentine</i>	<i>Terebinthina Laricis</i> , N. F.
<i>Venice Turpentine Petrox</i>	<i>Petroxolinum Terebinthinæ Laricis</i> , N. F.
<i>Venice Turpentine Petrozolin</i>	<i>Petroxolinum Terebinthinæ Laricis</i> , N. F.
<i>Veratrine</i>	<i>Veratrina</i> , U. S. P.
<i>Veratrine Ointment</i>	<i>Unguentum Veratrinæ</i> , N. F.
<i>Veratrine, Oleate of</i>	<i>Oleatum Veratrinæ</i> , N. F.
<i>Veratrinum</i>	<i>Veratrina</i> , U. S. P.
<i>Veratrum</i>	<i>Veratrum</i> , U. S. P. VIII.
<i>Veratrum Viride</i>	<i>Veratrum Viride</i> , U. S. P.
<i>Veratrum Viride, Fluidextract of</i>	<i>Fluidextractum Veratri Viridis</i> , U. S. P.
<i>Veratrum Viride, Tincture of</i>	<i>Tinctura Veratri Viridis</i> , U. S. P.
<i>Verbena</i>	<i>Verbena</i> , N. F.
<i>Verbena, Fluidextract of</i>	<i>Fluidextractum Verbenæ</i> , N. F.
<i>Verbascum, Fluidextract of</i>	<i>Fluidextractum Verbasci</i> , N. F.
<i>Vermuth</i>	<i>Absinthium</i> , N. F.
<i>Vesalvine</i>	<i>Hexamethylamina</i> , U. S. P.
<i>Vesicating Collodium</i>	<i>Collodium Cantharidatum</i> , U. S. P.
<i>Viburnum</i>	<i>Viburnum Prunifolium</i> , U. S. P.
<i>Viburnum, Compound tincture of</i>	<i>Tinctura Viburni Opuli Composita</i> , N. F.
<i>Viburnum Opulus</i>	<i>Viburnum Opulus</i> , N. F.
<i>Viburnum Opulus, Compound Elixir of</i>	<i>Elixir Viburni Opuli Compositum</i> , N. F.
<i>Viburnum Opulus, Fluidextract of</i>	<i>Fluidextractum Viburni Opuli</i> , N. F.
<i>Viburnum Prunifolium</i>	<i>Viburnum Prunifolium</i> , U. S. P.
<i>Viburnum, Prunifolium Elixir of</i>	<i>Elixir Viburni Prunifolii</i> , N. F.
<i>Viburnum Prunifolium, Extract of</i>	<i>Extractum Viburni Prunifolii</i> , U. S. P.
<i>Viburnum Prunifolium, Fluidextract of</i>	<i>Fluidextractum Viburni Prunifolii</i> , U. S. P.
<i>Vichy Salt, Artificial</i>	<i>Sal Vichyanum Factitium</i> , N. F.
<i>Vichy Salt, Effervescent Artificial</i>	<i>Sal Vichyani Factitii Effervescens</i> , N. F.
<i>Vichy Salt with Lithium, Effervescent Artificial</i>	<i>Sal Vichyani Factitii Effervescens, cum Lithio</i> , N. F.
<i>Villate's Mixture</i>	<i>Mistura Adstringens</i> , N. F.
<i>Vinegar, Aromatic</i>	<i>Acetum Aromaticum</i> , N. F.
<i>Vinegar of Lobelia</i>	<i>Acetum Lobeliæ</i> , N. F. III.
<i>Vinegar of Opium</i>	<i>Acetum Opii</i> , N. F.
<i>Vinegar of Sanguinaria</i>	<i>Acetum Sanguinariæ</i> , N. F. III.
<i>Vinegar of Squill</i>	<i>Acetum Scillæ</i> , U. S. P.
<i>Vinous Tincture of Rhubarb</i>	<i>Tinctura Rhei Vinosa</i> , N. F. III.
<i>Vinum Ferri Citratis</i>	<i>Vinum Ferri</i> , N. F.
<i>Virginia Snakeroot</i>	<i>Serpentaria</i> , U. S. P.
<i>Vlemincx' Lotion</i>	<i>Liquor Calcis Sulphuratæ</i> , N. F.
<i>Vlemincx' Solution</i>	<i>Liquor Calcis Sulphuratæ</i> , N. F.
<i>Volatile Liniment</i>	<i>Linimentum Ammoniacæ</i> , U. S. P.
<i>Volatile Oil of Mustard</i>	<i>Oleum Sinapis Volatile</i> , U. S. P.
<i>Volatile Oil, Spirit of a</i>	<i>Spiritus Olei Volatilis</i> , N. F.
<i>Wahoo Bark</i>	<i>Euonymus</i> , N. F.
<i>Warburg's Pills</i>	<i>Pilulæ Antiperiodicæ</i> , N. F.
<i>Warburg's Tincture</i>	<i>Tinctura Antiperiodica</i> , N. F.
<i>Warburg's tincture without aloes</i>	<i>Tinctura Antiperiodica sine Aloe</i> , N. F.
<i>Warming Plaster</i>	<i>Emplastrum Picis Cantharidatum</i> , N. F. III.
<i>Warren's Styptic</i>	<i>Lotio Adstringens</i> , N. F. III.
<i>Washed Sulphur</i>	<i>Sulphur Lotum</i> , U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Water.....	Aqua, U. S. P.
Water. (See also under name of drug.)	
Water, Ammonia.....	Aqua Ammonise, U. S. P.
Water, Anise.....	Aqua Anisi, U. S. P.
Water, Bitter Almond.....	Aqua Amygdalæ Amaræ, U. S. P.
Water, Camphor.....	Aqua Camphoræ, U. S. P.
Water, Chloroform.....	Aqua Chloroformi, U. S. P.
Water, Cinnamon.....	Aqua Cinnamoni, U. S. P.
Water, Creosote.....	Aqua Creosti, U. S. P.
Water, Distilled.....	Aqua Destillata, U. S. P.
Water, Fennel.....	Aqua Fœniculi, U. S. P.
Water, Hamamelis.....	Aqua Hamamelidis, U. S. P.
Water, Orange Flower.....	Aqua Aurantii Florum, U. S. P.
Water, Peppermint.....	Aqua Menthæ Piperitæ, U. S. P.
Water, Rose.....	Aqua Rosæ, U. S. P.
Water, Spearmint.....	Aqua Menthæ Viridis, U. S. P.
Water, Sterilized Distilled.....	Aqua Destillata Sterilisata, U. S. P.
Water, Stronger Ammonia.....	Aqua Ammonise Fortior, U. S. P.
Water, Stronger Orange Flower.....	Aqua Aurantii Florum Fortior, U. S. P.
Water, Stronger Rose.....	Aqua Rosæ Fortior, U. S. P.
Wax, White.....	Cera Alba, U. S. P.
Wax, Yellow.....	Cera Flava, U. S. P.
Whisky.....	Spiritus Frumenti, U. S. P. VIII.
White Agaric.....	Agaricus, N. F.
White Ash Bark.....	Fraxinus, N. F.
White Ash, Wine of.....	Vinum Fraxini Americanæ, N. F.
White Castile Soap.....	Sapo, U. S. P.
White Dextrin.....	Dextrinum Album, N. F.
White Lead.....	Plumbi Carbonas, N. F.
White Mustard.....	Sinapis Alba, U. S. P.
White Oak Bark.....	Quercus, N. F.
White Petrolatum.....	Petroxolatum Album, U. S. P.
White Petroleum Jelly.....	Petrolatum, U. S. P.
White Pine Bark.....	Pinus Alba, N. F.
White Pine, Compound Syrup of.....	Syrupus Pini Strobi Compositus, N. F.
White Pine with Morphine, Compound Syrup of.....	Syrupus Pini Strobi Compositus cum Morphina, N. F.
White Precipitate.....	Hydrargyrum Ammoniatum, U. S. P.
White Precipitate Ointment.....	Unguentum Hydrargyri Ammoniatum, U. S. P.
White Sandal Wood.....	Santalum Album, N. F.
White Vaseline.....	Petrolatum Album, U. S. P.
White Walnut Bark.....	Juglans, N. F.
White Wax.....	Cera Alba, U. S. P.
White Wine.....	Vinum Album, U. S. P. VIII.
Wild Black Cherry Bark.....	Prunus Virginiana, U. S. P. IX.
Wild Chamomile.....	Matricaria, U. S. P.
Wild Cherry.....	Prunus Virginiana, U. S. P.
Wild Cherry, Fluidextract of.....	Fluidextractum Pruni Virginianæ, N. F.
Wild Cherry, Infusion of.....	Infusum Pruni Virginianæ, N. F.
Wild Cherry, Syrup of.....	Syrupus Pruni Virginianæ, U. S. P.
Wild Cherry, Ferrated Wine of.....	Vinum Pruni Virginianæ Ferratum, N. F.
Wild Cherry, Wine of.....	Vinum Pruni Virginianæ, N. F.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Wild Ginger.....	Asarum, N. F.
Wild Indigo Root.....	Dioscorea, N. F.
Wilkinson's Ointment.....	Unguentum Sulphuris Compositum, N. F.
Wine of Aloes.....	Vinum Aloes, N. F. III.
Wine of Antimony.....	Vinum Antimonii, N. F.
Wine of Beef.....	Vinum Carnis, N. F.
Wine of Beef and Iron.....	Vinum Carnis et Ferri, N. F.
Wine of Beef, Iron, and Cinchona.....	Vinum Carnis, Ferri et Cinchonæ, N. F. III.
Wine of Citrate of Iron.....	Vinum Ferri, N. F.
Wine of Coca.....	Vinum Cocæ, U. S. P. VIII.
Wine of Colchicum Corm.....	Vinum Colchici Cormi, N. F.
Wine of Colchicum Root.....	Vinum Colchici Radicis, N. F. III.
Wine of Colchicum Seed.....	Vinum Colchici Seminis, N. F.
Wine of Ergot.....	Vinum Ergotæ, U. S. P. VIII.
Wine of Ipecac.....	Vinum Ipecacuanhæ, N. F.
Wine of Iron.....	Vinum Ferri, N. F.
Wine of Iron, Bitter.....	Vinum Ferri Amarum, N. F.
Wine of Opium.....	Vinum Opii, U. S. P. VIII.
Wine of Orange, Compound.....	Vinum Aurantii Compositum, N. F.
Wine of Pepsin.....	Vinum Pepsini, N. F.
Wine of Rhubarb.....	Vinum Rhei, N. F. III.
Wine of Rhubarb, Compound.....	Vinum Rhei Compositum, N. F.
Wine of Tor.....	Vinum Picis, N. F.
Wine of White Ash.....	Vinum Fraxini, N. F.
Wine of Wild Cherry.....	Vinum Pruni Virginianæ, N. F.
Wine of Wild Cherry, Ferrated.....	Vinum Pruni Virginianæ, Ferratum, N. F.
Witch Hazel.....	Aqua Hamamelidis, U. S. P.
Witch Hazel Leaves.....	Hamamelidis Folia, N. F.
Wood Charcoal.....	Carbo Ligni, U. S. P.
Wool-Fat.....	Adeps Lanæ, U. S. P.
Wool-Fat, Hydrous.....	Adeps, Lanæ Hydrosus, U. S. P.
Worm Grass.....	Spigelia, U. S. P.
Wormwood.....	Absinthium, N. F.
Xametrin.....	Hexamethylenamina, U. S. P.
Xanthoxylum.....	Xanthoxylum, U. S. P.
Xanthoxylum, Fluidextract of.....	Fluidextractum Xanthoxyli, U. S. P.
Yeast, Compressed.....	Cerevisiæ Fermentum Compressum, N. F.
Yellow Cinchona.....	Cinchona, U. S. P.
Yellow Dock.....	Rumex, N. F.
Yellow Gentian Root.....	Gentiana, U. S. P.
Yellow Iodide of Mercury.....	Hydrargyri Iodidum Flavum, U. S. P.
Yellow Jasmine Root.....	Gelsemium, U. S. P.
Yellow Jasmine.....	Gelsemium, U. S. P.
Yellow Lotion.....	Lotio Flava, N. F.
Yellow Melilot.....	Melilotus, N. F.
Yellow Mercuric Oxide.....	Hydrargyri Oxidum Flavum, U. S. P.
Yellow Mercuric Oxide, Ointment of.....	Unguentum Hydrargyri Oxidi Flavi, U. S. P.
Yellow Mercuric Subsulphate.....	Hydrargyri Subsulphas, Flavus, N. F. III.
Yellow Mercurous Iodide.....	Hydrargyri Iodidum Flavum, U. S. P.
Yellow Mustard.....	Sinapis Alba, U. S. P.

Alphabetical list of official English titles, widely used synonyms, and trade names with the corresponding Latin titles of the U. S. P. and N. F.—Continued.

Yellow Peruvian Bark.....	Cinchona, U. S. P.
Yellow Sweet Clover.....	Melilotus, N. F.
Yellow Wash.....	Lotio Flava, N. F.
Yellow Wax.....	Cera Flava, U. S. P.
Yerba Santa.....	Eriodictyon, U. S. P.
Yolk of Egg.....	Ovi Vitellum Recens, N. F.
Yolk of Egg, Glycerite of.....	Glyceritum Vitelli, N. F.
Zea.....	Zea, N. F.
Zea, Fluidextract of.....	Fluidextractum Zee, N. F.
Zedoary.....	Zedoaria, N. F.
Zedoary, Bitter Tincture of.....	Tinctura Zedoariæ Amara, N. F.
Zinc.....	Zincum, U. S. P.
Zinc Acetate.....	Zinci Acetas, U. S. P.
Zinc and Iron, Compound Solution of.....	Liquor Zinci et Ferri Compositum, N. F.
Zinc and Aluminum, Compound Solution of.....	Liquor Zinci et Alumini Compositus, N. F.
Zinc Bromide.....	Zinci Bromidum, U. S. P. VIII.
Zinc Carbonate, Precipitated.....	Zinc Carbonas Præcipitatus, U. S. P.
Zinc Chloride.....	Zinci Chloridum, U. S. P.
Zinc Chloride, Solution of.....	Liquor Zinci Chloridi, U. S. P.
Zinc Glycerogelatin, Firm.....	Glycerogelatinum Zinci Durum, N. F.
Zinc Glycerogelatin, Soft.....	Glycerogelatinum Zinci Molle, N. F.
Zinc Iodide.....	Zinci Iodidum, U. S. P. VIII.
Zinc Mull.....	Mulla Zinci, N. F.
Zinc Ointment.....	Unguentum Zinci Oxidi, U. S. P.
Zinc Oleate.....	Oleatum Zinci, N. F. III.
Zinc, Oleate of.....	Oleatum Zinci, N. F. III.
Zinc Oxide.....	Zinci Oxidum, U. S. P.
Zinc Oxide, Ointment of.....	Unguentum Zinci Oxidi, U. S. P.
Zinc Paste.....	Pasta Zinci, N. F.
Zinc Paste, Sulphurated.....	Pasta Zinci Sulphurata, N. F.
Zinc Phenolsulphonate.....	Zinci Phenolsulphonas, U. S. P.
Zinc Salve Mull.....	Unguentum Zinci Extensum, N. F. III.
Zinc Sulphate.....	Zinci Sulphas, U. S. P.
Zinc Sulphocarbolate.....	Zinci Phenolsulphonas, U. S. P.
Zinc Stearate.....	Zinci Stearas, U. S. P.
Zinc Stearate, Ointment of.....	Unguentum Zinci Stearatis, N. F.
Zincum Chloratum.....	Zinci Chloridum, U. S. P.
Zincum Oxydatum.....	Zinci Oxidum, U. S. P.
Zincum Sulfuricum.....	Zinci Sulphas, U. S. P.
Zincum Valerianicum.....	Zinci Valeras, U. S. P.
Zinc Valerate.....	Zinci Valeras, U. S. P.
Zinc Valerate, Elixir of.....	Elixir Zinci Valeratis, N. F.
Zinc Valerianate.....	Zinci Valeras, U. S. P.

HYGIENIC LABORATORY BULLETINS OF THE PUBLIC HEALTH SERVICE.

The Hygienic Laboratory was established in New York, at the Marine Hospital on Staten Island, August, 1887. It was transferred to Washington, with quarters in the Butler Building, June 11, 1891, and a new laboratory building, located in Washington, was authorized by act of Congress March 3, 1901.

The following bulletins [Bulls. Nos. 1-7, 1900 to 1902, Hyg. Lab., U. S. Mar.-Hosp. Serv., Wash.] have been issued:

*No. 1.—Preliminary note on the viability of the *Bacillus pestis*. By M. J. Rosenau.

No. 2.—Formalin disinfection of baggage without apparatus. By M. J. Rosenau.

*No. 3.—Sulphur dioxid as a germicidal agent. By H. D. Geddings.

*No. 4.—Viability of the *Bacillus pestis*. By M. J. Rosenau.

No. 5.—An investigation of a pathogenic microbe (*B. typhi murium* Danyz) applied to the destruction of rats. By M. J. Rosenau.

*No. 6.—Disinfection against mosquitoes with formaldehyde and sulphur dioxid. By M. J. Rosenau.

†No. 7.—Laboratory technique: Ring test for indol, by S. B. Grubbs and Edward Francis; Collodium sacs, by S. B. Grubbs and Edward Francis; Microphotography with simple apparatus, by H. B. Parker.

By act of Congress approved July 1, 1902, the name of the "United States Marine-Hospital Service" was changed to the "Public Health and Marine-Hospital Service of the United States," and three new divisions were added to the Hygienic Laboratory.

Since the change of name of the service the bulletins of the Hygienic Laboratory have been continued in the same numerical order, as follows:

*No. 8.—Laboratory course in pathology and bacteriology. By M. J. Rosenau. (Revised edition, March, 1904.)

†No. 9.—Presence of tetanus in commercial gelatin. By John F. Anderson.

*No. 10.—Report upon the prevalence and geographic distribution of hookworm disease (uncinariasis or ancylostomiasis) in the United States. By Ch. Wardell Stiles.

*No. 11.—An experimental investigation of *Trypanosoma lewisi*. By Edward Francis.

*No. 12.—The bacteriological impurities of vaccine virus; an experimental study. By M. J. Rosenau.

*No. 13.—A statistical study of the intestinal parasites of 500 white male patients at the United States Government Hospital for the Insane; by Philip E. Garrison, Brayton H. Ransom, and Earle C. Stevenson. A parasitic roundworm (*Agamomermis culicis* n. g., n. sp.) in American mosquitoes (*Culex sollicitans*); by Ch. Wardell Stiles. The type species of the cestode genus *Hymenolepis*, by Ch. Wardell Stiles.

*No. 14.—Spotted fever (tick fever) of the Rocky Mountains; a new disease. By John F. Anderson.

*No. 15.—Inefficiency of ferrous sulphate as an antiseptic and germicide. By Allen J. McLaughlin.

*No. 16.—The antiseptic and germicidal properties of glycerin. By M. J. Rosenau.

*No. 17.—Illustrated key to the trematode parasites of man. By Ch. Wardell Stiles.

*No. 18.—An account of the tapeworms of the genus *Hymenolepis* parasitic in man, including reports of several new cases of the dwarf tapeworm (*H. nana*) in the United States. By Brayton H. Ransom.

*No. 19.—A method for inoculating animals with precise amounts. By M. J. Rosenau.

*No. 20.—A zoological investigation into the cause, transmission, and source of Rocky Mountain "spotted fever." By Ch. Wardell Stiles.

*No. 21.—The immunity unit for standardizing diphtheria antitoxin (based on Ehrlich's normal serum). Official standard prepared under the act approved July 1, 1902. By M. J. Rosenau.

*No. 22.—Chloride of zinc as a deodorant, antiseptic, and germicide. By T. B. McClintic.

*No. 23.—Changes in the pharmacopoeia of the United States of America. Eighth decennial revision. By Reid Hunt and Murray Galt Motter.

No. 24.—The international code of zoological nomenclature as applied to medicine. By Ch. Wardell Stiles.

*No. 25.—Illustrated key to the cestode parasites of man. By Ch. Wardell Stiles.

*No. 26.—On the stability of the oxidases and their conduct toward various reagents. The conduct of phenolphthalein in the animal organism. A test for saccharin, and a simple method of distinguishing between cumarin and vanillin. The toxicity of ozone and other oxidizing agents to lipase. The influence of chemical constitution on the lipolytic hydrolysis of ethereal salts. By J. H. Kastle.

*No. 27.—The limitations of formaldehyde gas as a disinfectant with special reference to car sanitation. By Thomas B. McClintic.

*No. 28.—A statistical study of the prevalence of intestinal worms in man. By Ch. Wardell Stiles and Philip E. Garrison.

*No. 29.—A study of the cause of sudden death following the injection of horse serum. By M. J. Rosenau and John F. Anderson.

†No. 30.—I. Maternal transmission of immunity to diphtheria toxine. II. Maternal transmission of immunity to diphtheria toxine and hypersusceptibility to horse serum in the same animal. By John F. Anderson.

†No. 31.—Variations in the peroxidase activity of the blood in health and disease. By Joseph H. Kastle and Harold L. Amoss.

†No. 32.—A stomach lesion in guinea pigs caused by diphtheria toxine and its bearing upon experimental gastric ulcer. By M. J. Rosenau and John F. Anderson.

*No. 33.—Studies in experimental alcoholism. By Reid Hunt.

†No. 34.—I. *Agamofilaria georgiana* n. sp., an apparently new roundworm parasite from the ankle of a negress. II. The zoological characters of the roundworm genus *Filaria* Mueller, 1787. III. Three new American cases of infection of man with horsehair worms (species *Paragordius varius*), with summary of all cases reported to date. By Ch. Wardell Stiles.

†No. 35.—Report on the origin and prevalence of typhoid fever in the District of Columbia. By M. J. Rosenau, L. L. Lumsden, and Joseph H. Kastle. (Including articles contributed by Ch. Wardell Stiles, Joseph Goldberger, and A. M. Stimson.)

†No. 36.—Further studies upon hypersusceptibility and immunity. By M. J. Rosenau and John F. Anderson.

†No. 37.—Index-catalogue of medical and veterinary zoology. Subjects: Trematoda and trematode diseases. By Ch. Wardell Stiles and Albert Hassall.

No. 38.—The influence of antitoxin upon post-diphtheritic paralysis. By M. J. Rosenau and John F. Anderson.

†No. 39.—The antiseptic and germicidal properties of solutions of formaldehyde and their action upon toxines. By John F. Anderson.

†No. 40.—1. The occurrence of a proliferating cestode larva (*Sparganum proliferum*) in man in Florida, by Ch. Wardell Stiles. 2. A reexamination of the type

specimen of *Filaria restiformis* Leidy, 1880 = *Agramomermis restiformis*, by Ch. Wardell Stiles. 3. Observations on two new parasitic trematode worms: *Homalogaster philippinensis* n. sp., *Agamodistomum nanus* n. sp., by Ch. Wardell Stiles and Joseph Goldberger. 4. A reexamination of the original specimen of *Tania saginata abietina* (Weinland, 1858), by Ch. Wardell Stiles and Joseph Goldberger.

†No. 41.—Milk and its relation to the public health. By various authors.

†No. 42.—The thermal death points of pathogenic microorganisms in milk. By M. J. Rosenau.

†No. 43.—The standardization of tetanus antitoxin (an American unit established under authority of the act of July 1, 1902). By M. J. Rosenau and John F. Anderson.

No. 44.—Report No. 2 on the origin and prevalence of typhoid fever in the District of Columbia, 1907. By M. J. Rosenau, L. L. Lumsden, and Joseph H. Kastle.

†No. 45.—Further studies upon anaphylaxis. By M. J. Rosenau and John F. Anderson.

No. 46.—*Hepatosoon perniciosum* (n. g., n. sp.); a hæmogregarine pathogenic for white rats; with a description of the sexual cycle in the intermediate host, a mite (*Ielaps echidninus*). By W. W. Miller.

No. 47.—Studies on thyroid: I. The relation of iodine to the physiological activity of thyroid preparations. By Reid Hunt and Atherton Seidell.

No. 48.—The physiological standardization of digitalis. By Charles Wallis Edmunds and Worth Hale.

No. 49.—Digest of comments on the United States pharmacopœia. Eighth decennial revision for the period ending December 31, 1905. By Murray Galt Motter and Martin I. Wilbert.

No. 50.—Further studies upon the phenomenon of anaphylaxis. By M. J. Rosenau and John F. Anderson.

No. 51.—Chemical tests for blood. By Joseph H. Kastle.

No. 52.—Report No. 3 on the origin and prevalence of typhoid fever in the District of Columbia (1908). By M. J. Rosenau, Leslie L. Lumsden, and Joseph H. Kastle.

No. 53.—The influence of certain drugs upon the toxicity of acetanilide and antipyrine. By Worth Hale.

No. 54.—The fixing power of alkaloids on volatile acids and its application to the estimation of alkaloids with the aid of phenolphthalein or by the Volhard method. By Elias Elvove.

No. 55.—Quantitative pharmacological studies; adrenalin and adrenalin-like bodies. By W. H. Schultz.

No. 56.—Milk and its relation to the public health. (Revised edition of Bulletin No. 41.) By various authors.

No. 57.—I. The presence of tubercle bacilli in the circulating blood in clinical and experimental tuberculosis. By John F. Anderson. II. The viability of the tubercle bacillus. By M. J. Rosenau.

No. 58.—Digest of comments on the pharmacopœia of the United States of America (eighth decennial revision) and the national formulary for the period ending December 31, 1906. By Murray Galt Motter and Martin I. Wilbert.

No. 59.—The oxidases and other oxygen catalysts concerned in biological oxidations. By Joseph Hoeing Kastle.

No. 60.—A study of the anatomy of *Watsonius* (n. g.), *Watsoni* of man, and of 19 allied species of mammalian trematode worms of the superfamily *Paramphistomoidæ*. By Ch. Wardell Stiles and Joseph Goldberger.

No. 61.—Quantitative pharmacological studies: Relative physiological activity of some commercial solutions of epinephrin. By W. H. Schultz.

No. 62.—The taxonomic value of the microscopic structure of the stigmal plates in the tick genus *Dermacentor*. By Ch. Wardell Stiles.

†No. 63.—Digest of comments on the pharmacopœia of the United States of America (eighth decennial revision) and the national formulary (third edition) for the calendar year ending December 31, 1907. By Murray Galt Motter and Martin I. Wilbert.

No. 64.—Studies upon anaphylaxis, with special reference to the antibodies concerned. By John F. Anderson and W. H. Frost.

No. 65.—Facts and problems of rabies. By A. M. Stimson.

No. 66.—I. The influence of age and temperature on the potency of diphtheria antitoxin. By John F. Anderson. II. An organism (*Pseudomonas protea*) isolated from water, agglutinated by the serum of typhoid-fever patients. By W. H. Frost. III. Some considerations on colorimetry, and a new colorimeter. By Norman Roberts. IV. A gas generator, in four forms, for laboratory and technical use. By Norman Roberts.

†No. 67.—The solubilities of the pharmacopœial organic acids and their salts. By Atherton Seidell.

No. 68.—The bleaching of flour and the effect of nitrites on certain medicinal substances. By Worth Hale.

No. 69.—The effects of restricted diet and of various diets upon the resistance of animals to certain poisons. By Reid Hunt.

No. 70.—A study of melting-point determinations, with special reference to the melting-point requirements of the United States pharmacopœia. By George A. Menge.

No. 71.—1. Some known and three new endoparasitic trematodes from American fresh-water fish. By Joseph Goldberger. 2. On some new parasitic trematode worms of the genus *Telorchis*. By Joseph Goldberger. 3. A new species of *Atheimia* from a monkey. By Joseph Goldberger and Charles G. Crane.

†No. 72.—I. Report on an outbreak of typhoid fever at Omaha, Nebr. (1909-1910), by L. L. Lumsden. II. The water supply of Williamson, W. Va., and its relation to an epidemic of typhoid fever. By W. H. Frost.

No. 73.—The effect of a number of derivatives of choline and analogous compounds on the blood pressure. By Reid Hunt and R. de M. Taveau.

No. 74.—Digitalis standardization and the variability of crude and of medicinal preparations. By Worth Hale.

No. 75.—Digest of comments on the pharmacopœia of the United States of America (eighth decennial revision) and the national formulary (third edition) for the calendar year ending December 31, 1908. By Murray Galt Motter and Martin I. Wilbert.

No. 76.—The physiological standardization of ergot. By Charles Wallis Edmunds and Worth Hale.

No. 77.—Sewage pollution of interstate and international waters, with special reference to the spread of typhoid fever. By Allan J. McLaughlin.

No. 78.—Report No. 4 on the origin and prevalence of typhoid fever in the District of Columbia (1909). By L. L. Lumsden and John F. Anderson. (Including articles contributed by Thomas B. McClintic and Wade H. Frost.)

No. 79.—Digest of comments on the pharmacopœia of the United States of America (eighth decennial revision) and the national formulary (third edition) for the calendar year ending December 31, 1909. By Murray Galt Motter and Martin I. Wilbert.

No. 80.—Physiological studies in anaphylaxis. Reaction of smooth muscle from various organs of different animals to proteins. (Including reaction of muscle from nonsensitized, sensitized, tolerant, and immunized guinea pigs.) By William H. Schultz.

No. 81.—Tissue proliferation in plasma medium. By John Sundwall.

No. 82.—I. Method of standardizing disinfectants with and without organic matter. By John F. Anderson and Thomas B. McClintic. II. The determination of the phenol coefficient of some commercial disinfectants. By Thomas B. McClintic.

No. 83.—I. Sewage pollution of interstate and international waters with special reference to the spread of typhoid fever. II. Lake Superior and St. Marys River. III. Lake Michigan and the Straits of Mackinac. IV. Lake Huron, St. Clair River, Lake St. Clair, and the Detroit River. V. Lake Ontario and St. Lawrence River. By Allan J. McLaughlin.

No. 84.—Digest of comments on the pharmacopœia of the United States of America (eighth decennial revision) and the national formulary (third edition) for the calendar year ending December 31, 1910. By Murray Galt Motter and Martin I. Wilbert.

No. 85.—Index catalogue of medical and veterinary zoology. Subjects: Cestoda and cestodaria. By Ch. Wardell Stiles and Albert Hassall.

No. 86.—Studies on typhus. By John F. Anderson and Joseph Goldberger.

No. 87.—Digest of Comments on the pharmacopœia of the United States of America (eighth decennial revision) and on the national formulary (third edition) for the calendar year ending December 31, 1911. By Murray Galt Motter and Martin I. Wilbert.

No. 88.—Method for determining the toxicity of coal-tar disinfectants, together with a report on the relative toxicity of some commercial disinfectants. By Worth Hale.

No. 89.—Sewage pollution of interstate and international waters with special reference to the spread of typhoid fever. VI. The Missouri River from Sioux City to its mouth. By Allan J. McLaughlin.

No. 90.—Epidemiologic studies of acute anterior poliomyelitis. I. Poliomyelitis in Iowa, 1910. II. Poliomyelitis in Cincinnati, Ohio, 1911. III. Poliomyelitis in Buffalo and Batavia, N. Y., 1912. By Wade H. Frost.

No. 91.—I. The cause of death from subdural injections of serum. By Worth Hale. II. Some new cholera selective media. By Joseph Goldberger.

No. 92.—Gaseous impurities in the air of railway tunnels. By Atherton Seidell and Philip W. Meserve.

No. 93.—Digest of comments on the pharmacopœia of the United States of America (eighth decennial revision) and on the national formulary (third edition) for the calendar year ending December 31, 1912. By Murray Galt Motter and Martin I. Wilbert.

No. 94.—I. Collected studies on the insect transmission of *Trypanosoma evansi*. By M. Bruin Mitzmain. II. Summary of experiments in the transmission of anthrax by biting flies. By M. Bruin Mitzmain.

No. 95.—Laboratory studies on tetanus. By Edward Francis.

No. 96.—1. Report of investigation of coastal waters in the vicinity of Gulfport and Biloxi, Miss., with special reference to the pollution of shellfish. By R. H. Creel. 2. A comparison of methods for the determination of oxygen in waters in presence of nitrite. By Elias Elvove. 3. Some new compounds of the choline type. III. Including preparation of monoacetate of α , β dioxy- β -methyl butane. By G. A. Menge. 4. The detection of white phosphorus in matches. By Earle B. Phelps. 5. The chemical composition of rubber in nursing nipples and in some rubber toys. By Earle B. Phelps and Albert F. Stevenson. 6. The analysis of thymol capsules. By Atherton Seidell. 7. Seasonal variation in the composition of the thyroid gland. By Atherton Seidell and Frederic Fenger. 8. Note on a new apparatus for use with the Winkler method for dissolved oxygen in water. By Hyman L. Shoub. 9. The pharmacological action of some serum preservatives. By Carl Voegtlin.

No. 97.—1. Some further siphonaptera. 2. A further report on the identification of some siphonaptera from the Philippine Islands. 3. The taxonomic value of the copulatory organs of the females in the order of siphonaptera. By Carroll Fox.

No. 98.—Digest of comments on the pharmacopœia of the United States of America (eighth decennial revision) and on the national formulary (third edition) for the calendar year ending December 31, 1913. By Murray Galt Motter and Martin I. Wilbert.

No. 99.—The Friedmann treatment for tuberculosis. A report of the board appointed for its investigation. By John F. Anderson and Arthur M. Stimson.

No. 100.—Pituitary standardization; a comparison of the physiological activity of some commercial pituitary preparations. By George B. Roth. 2. Examination of drinking water on railroad trains. By Richard H. Creel. 3. Variation in the epinephrine content of suprarenal glands. By Atherton Seidell and Frederic Fenger.

No. 101.—I. Complement fixation in tuberculosis. By A. M. Stimson. II. Report of an investigation of diphtheria carriers. By Joseph Goldberger, C. L. Williams, and F. W. Hatchel. III. The excretion of thymol in the urine. By Atherton Seidell. IV. The sterilization of dental instruments. By H. E. Hasseltine. V. A modification of Rose's method for the estimation of pepsin. By Maurice H. Givens.

No. 102.—I. Digitalis standardization. The physiological evaluation of fat-free digitalis and commercial digitalin. By George B. Roth. II. Preliminary observations on metabolism in pellagra. By Andrew Hunter, Maurice H. Givens, and Robert C. Lewis.

No. 103.—I. Chemical changes in the central nervous system as a result of restricted vegetable diet. By Mathilde L. Koch and Carl Voegtlin. II. Chemical changes in the central nervous system in pellagra. By Mathilde L. Koch and Carl Voegtlin.

No. 104.—Investigation of the pollution and sanitary conditions of the Potomac watershed, with special reference to self-purification and the sanitary condition of shellfish in the lower Potomac River. By Hugh S. Cumming. With plankton studies by W. C. Purdy and hydrographic studies by Homer P. Ritter.

No. 105.—Digest of comments on the Pharmacopœia of the United States of America and on the National Formulary for the calendar year ending December 31, 1914. By Martin I. Wilbert.

No. 106.—I. Studies in pellagra. Tissue alterations in malnutrition and pellagra. By John Sundwall. II. Cultivation experiments with the blood and spinal fluid of pellagrins. By Eduard Francis. III. Further attempts to transmit pellagra to monkeys. By Eduard Francis.

No. 107. Changes in the Pharmacopœia and the National Formulary; a digest of the changes and requirements included in the Pharmacopœia of the United States (ninth decennial revision) and in the National Formulary (fourth issue), with references to the titles not continued from the preceding editions. By Martin I. Wilbert.

In citing these bulletins bibliographers and authors are requested to adopt the following abbreviations: Bull. No. —, Hyg. Lab., Wash., pp. —.

The service will enter into exchange of publications with medical and scientific organizations, societies, laboratories, journals, and authors. ALL APPLICATIONS FOR THESE PUBLICATIONS SHOULD BE ADDRESSED TO THE "Surgeon General, U. S. Public Health Service, Washington, D. C.," EXCEPT THOSE MARKED (*) AND (†).

The publications marked (*) are no longer available for distribution by the Surgeon General of the Public Health Service. Copies of those marked (†) may, however, be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., who sells publications at cost, and to whom requests for publications thus marked should be made.



**ADDITIONAL COPIES
OF THIS PUBLICATION MAY BE PROCURED FROM
THE SUPERINTENDENT OF DOCUMENTS
GOVERNMENT PRINTING OFFICE
WASHINGTON, D. C.
AT
30 CENTS PER COPY**

▽

**TREASURY DEPARTMENT
UNITED STATES PUBLIC HEALTH SERVICE**

HYGIENIC LABORATORY—BULLETIN No. 108

DECEMBER, 1916

**EXPERIMENTAL STUDIES
WITH MUSCICIDES AND OTHER FLY-
DESTROYING AGENCIES**

By

EARLE B. PHELPS

AND

ALBERT F. STEVENSON



**WASHINGTON
GOVERNMENT PRINTING OFFICE
1917**

ORGANIZATION OF HYGIENIC LABORATORY.

RUPERT BLUE, *Surgeon General.*

United States Public Health Service.

ADVISORY BOARD.

Maj. Eugene R. Whitmore, Medical Corps, United States Army; Medical Director E. R. Stitt, United States Navy; Dr. A. D. Melvin, Chief of United States Bureau of Animal Industry; and George W. McCoy, United States Public Health Service, *ex officio*.

Prof. William H. Welch, Johns Hopkins University, Baltimore, Md.; Prof. Simon Flexner, Rockefeller Institute for Medical Research, New York; Prof. Victor C. Vaughan, University of Michigan, Ann Arbor, Mich.; Prof. William T. Sedgwick, Massachusetts Institute of Technology, Boston, Mass.; Prof. M. P. Ravenel, University of Missouri, Columbia, Mo.

LABORATORY CORPS.

Director.—Surg. George W. McCoy.

Assistant Director.—Surg. A. M. Stimson.

Senior pharmacist.—C. O. Sterns, Ph. G.

Junior pharmacist.—Clyde Ritter, Ph. C.

Artist.—Leonard H. Wilder.

DIVISION OF PATHOLOGY AND BACTERIOLOGY.

In charge of division.—Surg. George W. McCoy.

Assistants.—Surgs. Hugh S. Cumming, Leslie L. Lumsden, Lunsford D. Fricks, Carroll Fox, A. M. Stimson; Passed Asst. Surgs. H. E. Hasseltine, James P. Leake; Asst. Surgs. Mather H. Neill, N. E. Wayson, and Gleason C. Lake.

DIVISION OF ZOOLOGY.

Professor of zoology.—Ch. Wardell Stiles, Ph. D.

Assistant.—Surg. Joseph Goldberger.

Technical assistant.—Walter D. Cannon, LL. B., A. B., M. D.

DIVISION OF PHARMACOLOGY.

Professor of pharmacology.—Carl Voegtlin, Ph. D.

Technical assistants.—Atherton Seldell, Ph. D.; Murray Galt Motter, A. M., M. D.; George B. Roth, A. B., M. D.

DIVISION OF CHEMISTRY.

Professor of chemistry.—Earle B. Phelps, S. B.

Sanitary chemist.—Albert F. Stevenson, S. B.

Technical assistant.—Elias Elvove, M. S., Pharm. D.

TABLE OF CONTENTS.

	Page.
Introduction.....	5
Danger attending use of poison fly papers.....	6
Nature of problem to be studied.....	6
Life history of fly.....	7
Breeding places.....	7
Eggs.....	8
Larvæ.....	8
Pupæ.....	8
Adult flies.....	8
The breeding of flies.....	8
Stock flies.....	9
Experimental flies.....	9
General plan of experiments.....	10
Experimental cages.....	10
Containers for poison solution.....	10
Transferring and counting flies.....	10
Standard poison solution.....	11
Procedure for testing the killing power of a muscicide.....	12
Coefficient.....	12
Experimental results.....	12
Normal mortality rate.....	12
Preliminary survey of possible muscicides.....	14
Special study of certain muscicides.....	21
Temperature effect.....	21
Most efficient concentration of formaldehyde.....	22
Attractiveness.....	22
Comparison with commercial arsenic papers.....	24
Summary of experimental results.....	24
Practical Interpretation of Corrected Mortality figures.....	24
Numerical.....	24
Attractive agents.....	26
Use of muscicides.....	26
Preparation of solutions.....	26
Containers for solutions.....	27
Sticky fly papers.....	27
Compounding and testing of sticky preparations.....	27
Improvements in handling sticky preparations.....	28
Comparison of the efficiencies of sticky papers and muscicides.....	29
Summary and conclusions.....	29
Acknowledgments.....	30

LIST OF ILLUSTRATIONS.

	Page
FIGURE I. Experimental fly cages.....	11
II. Homemade poison trap.....	28

EXPERIMENTAL STUDIES WITH MUSCICIDES AND OTHER FLY DESTROYING AGENCIES.¹

By EARLE B. PHELPS, *Professor of Chemistry*, and ALBERT F. STEVENSON, *Sanitary Chemist*.

INTRODUCTION.

In the general public health campaign for the eradication of the fly, not the least important of the many destructive measures available are those capable of being employed within the household. These constitute in a measure the last line of defense and are aimed against those flies, relatively few in number, which have escaped such general public measures as the elimination of breeding places and that most important individual measure, effective screening. Even when most successful these measures have not heretofore given entire protection, and it has been necessary to supplement them with one or another form of destruction within the household itself.

For this purpose various devices are available, comprising in general poisoning, trapping, and "swatting." Each of these various methods has distinct advantages and disadvantages. The trapping of flies, either in mechanical traps or upon sticky preparations, while reasonably effective, is, under most conditions, an undesirable procedure by reason of its unsightliness and other unpleasant aspects. The practice of swatting, despite the faulty biological reasoning so often urged by its enthusiastic supporters, whereby the effectiveness of a single swat is multiplied many million fold, certainly does possess the advantage of a very definite 100 per cent efficiency. Its disadvantage lies chiefly in the effort and earnestness which it demands, factors which are apt to be affected by rising temperature inversely as the multiplication rate among the flies. The poisoning of flies is most simple and least objectionable from an esthetic standpoint except for the single disadvantage that the dead flies are scattered about the rooms and require some further attention on the score of neatness. Everything considered, this method seems to possess the

¹ Manuscript submitted for publication Aug. 4, 1916.

fewest disadvantages in proportion to its advantages, and were it not for the single fact that poison fly papers and preparations are quite generally known to contain arsenic or other strong poisonous material, there is no doubt that their use would be greatly extended.

DANGER ATTENDING USE OF POISON FLY PAPERS.

The fact that such use is attended with no small danger, especially among young children, can not be overlooked, nor has it been. The magazine "Child Betterment and Social Welfare," a monthly published in the general interest of the child, collected, through the medium, it is understood, of press clippings only, evidence of 47 cases of arsenical poisoning from the accidental or ignorant use of poison fly preparations during the summer of 1914. The majority of these cases were among children, 34 of them being among those under 3 years of age. Many of the cases resulted fatally. It is stated editorially in a discussion of this danger—and it is believed the statement is correct—that there is such a similarity between the symptoms of arsenical poisoning among young children and of cholera infantum that many of the cases diagnosed as this more common disease of infancy were doubtless the result of arsenical poisoning. No less than 20 medical journals, including those of some of the leading State medical associations of the United States, have published within the past two years editorials commenting upon this matter.

These facts being thus rather widely distributed, it is safe to assume that their knowledge has acted in a considerable degree to deter the better informed from using preparations of this type. Quite apart from the accidental or ignorant misuse of these arsenical preparations, and a matter which does not seem to have attracted attention or comment, is the ready accessibility without restriction of considerable quantities of a dangerous poison capable of being put to criminal use. It is at least inconsistent that a quantity of arsenic or its compounds in the form of poisonous fly paper can be obtained by anyone, without any explanation or record, which could not in most States be obtained through the usual channels except upon the registration of the purchase in a permanent record.

NATURE OF PROBLEM TO BE STUDIED.

It has seemed quite desirable, therefore, to investigate this subject with special reference to the selection of some other substances which, under ordinary conditions of use and of accidental or ignorant misuse, would not be so dangerous to the health and lives of children and which at the same time would serve equally well, or better, for the destruction of flies. It also seemed desirable to consider at the same time the general subject of sticky fly papers, more

especially with reference to the relative value of the two types of remedy and to the overcoming of obvious objections to the present form and manner of use.

In order to carry out such an investigation it was necessary at the outset to develop a general plan for the experimental determination of the value of any given muscicide. It was obvious that experiments of this sort could not be conducted in a haphazard way under the ordinary variable conditions existing in practice. On the other hand, it was quite important that the results should be applicable in practice and that the relative effects of these variations should be determined and embodied in any general conclusions. The problem, therefore, reduced itself to one of establishing an experimental technique in which the variable conditions were subject to exact control and by means of which each of these could be independently modified and its effect recorded.

The first and most important of these variables is the fly itself. A study of the available information upon the life habits of this insect led immediately to the belief, which was later amply confirmed, that in order to procure quantitative data this factor must be adequately controlled. Questions of age and of physiological activity and the effect upon the latter of such factors as temperature, light, and food supply, had to be recognized as independent variables for study. Again the matter of reaction between the fly and the muscicide plays an important part in the ultimate results. It is quite conceivable that a given substance which, if freely taken, would be extremely effective, might be quite unacceptable to the fly, or be taken only under stress of circumstances. A satisfactory muscicide, however, must compete in attractiveness with other food materials generally quite accessible in the household and must be at least unobjectionable. The possibility of compounding with an unobjectionable poison certain attractive agents had also to be considered.

It was determined, therefore, as a first step, to propagate flies, so that a suitable abundance of material might be available for experiment, this material being of uniform and definitely known history.

LIFE HISTORY OF FLY.

In order to propagate the house fly at will for experimental purposes, it is necessary to know something of its life history. The following condensed and summarized account is from "The House Fly, Disease Carrier," by L. O. Howard.

BREEDING PLACES.

The house fly will breed in almost any fermenting organic matter, but, by preference, lays its eggs on horse manure. Next to horse manure it is probably most attracted to human excreta.

EGGS.

The eggs are minute, glistening white, long ovoids, approximately one-sixth of an inch in length. They are laid in clusters, a female fly laying on the average about 120 eggs at one time. She may lay several times during her life. At midsummer temperature the egg covering splits, and the larva crawls out about eight hours later.

LARVÆ.

The young larva, popularly known as the maggot, tapers from the blunt round hinder end to the pointed head end. It is white in color and about 2 millimeters in length. It is extremely active, and burrows at once into the substance upon which the eggs are laid. The house-fly larva casts its skin twice during its development. The rate of growth depends upon the temperature. At midsummer temperature the period from the hatching to the first molt is approximately 24 hours; from the first molt to the second molt, 24 hours; and from the second molt to the transformation to the pupa, 72 hours; making the duration of larval life 5 days. The larvæ are very active and migrate with ease throughout the manure.¹ Just before the transformation into the pupal stage the larvæ get yellowish in color, owing to the proliferation of fat cells in great numbers in anticipation of the resting, nonfeeding, pupal stage.

PUPE.

Before the transformation to the pupa the full-grown larva empties its alimentary canal and contracts from its own skin, the skin itself forming a nearly cylindrical pupal case about 6 millimeters in length. At first the pupal skin is a pale yellow, but it soon changes to red and finally to a dark-chestnut color. The pupal stage lasts about five days, after which the adult fly emerges.

ADULT FLIES.

Flies of the same species often differ in size. This is dependent upon the temperature during the larval and pupal stages. After the fly emerges from the pupal shell it never increases in size. The limit of life of an adult fly in summer is approximately 21 days.

THE BREEDING OF FLIES.

Two distinct lots of flies were propagated for use in this work. (1) A great quantity of stock flies kept solely for breeding. (2) The experimental flies.

¹ We have found that the larvæ even leave the manure at times. They have traveled in some instances more than 50 feet over a concrete floor, where they perished. This migration was finally stopped by placing the manure pans on a bed of wet sand.

STOCK FLIES.

The flies used throughout these experiments were ordinary house flies (*Musca domestica*). They were laboratory bred from about 200 individuals obtained from a tray of infested horse manure. A small room was given up to the keeping and raising of the stock supply. Pans of fresh horse manure were always kept standing in this room, serving as a medium for the hatching of eggs. Food was also supplied in the form of pans of moistened bread. The temperature of the breeding room was maintained between 30° and 35° C. Fly eggs were deposited on the manure and also on the moistened bread. Many more were laid on the bread than on the same quantity of manure. It was found that the flies would not develop beyond the larval stage on the moistened bread, and consequently these larvæ when three or four days old were transferred to the manure, where they developed to adult flies. Approximately 10 days were required to raise an adult fly from the egg. This time in some instances was as low as eight and a half days. As only one generation of flies will breed in a lot of manure, the trays were freshly filled after each hatch.

EXPERIMENTAL FLIES.

For the experimental work it was desired to use material as homogeneous as possible. To this end each experiment was conducted upon a single batch of flies of the same age and bred under the same conditions. The factors of age, breeding temperature, and other physical conditions were noted in each case and made a part of the record of the experiment. By working in this way upon homogeneous material of known history, it was not only possible to obtain consistent quantitative results, but the effect of age and breeding conditions could also be measured and discussed.

The flies actually used in the experimental work were therefore raised in cages where they could be kept isolated and under observation. These cages were made with wooden bottoms and sides, but with a wire screen top. They were 36 inches on a side. A door 6 inches high, hinged at the top, was constructed at the bottom of one side and extended the width of the cage. It was found necessary to have three such cages in order to keep a continuous supply of proper material on hand.

A galvanized iron pan 6 inches deep filled with fresh horse manure was exposed to the flies in the stock-breeding room for 36 hours. It was then removed and placed in a breeding cage, where it remained until 2,000 or more flies hatched, when it was removed. Generally a plentiful supply of flies hatched within 36 hours from their first appearance. The mid-point of this period was taken as the "date of

hatching." This procedure was regulated so that a brood of flies hatched every three days.

GENERAL PLAN OF EXPERIMENTS.

In this study it was desired to determine the relative efficiencies of fly poisons. For this purpose a standard solution of arsenic was used throughout as a control, and the poison to be tested was compared with this standard under identical conditions. Tests were conducted on a few substances which had been recommended as fly poisons and also on a number of more or less active inorganic and organic substances which are comparatively nonpoisonous to man. Certain supposedly attractive agents, such as milk, brown sugar, and molasses, were also studied in combination with some of the poisons, and a quantitative measure of their attractiveness thereby obtained.

Flies from the same batch and of known age and history were transferred to each of three experimental cages. These were exposed for a definite period to the poison to be tested, to the standard poison, and to water, respectively, and after 24 hours a count of the dead flies was made. From this was computed the crude mortality in percentage. The crude mortality was corrected in each case by the normal death rate for flies of this age and at this temperature as determined in the control experiments. These corrected mortalities for the poison and the arsenic standard were then used to compute a relative coefficient for the poison in question under the stated conditions of age and temperature.

EXPERIMENTAL CAGES.

Five identical experimental cages were used in this work. They were 36 by 36 by 30 inches and were made of wire screening with wooden floors. A wooden slide, 12 inches wide, which could be moved in a vertical direction, was inserted on one side to provide a means of access to the cage. Figure I shows the arrangement of the cages in the room with reference to illumination. All cages received as nearly equal illumination as possible.

CONTAINERS FOR POISON SOLUTION.

The solutions of poisons to be studied were placed in 6-inch white porcelain evaporating dishes, in which two pieces of filter paper were laid, one end in the solution and the other projecting about 3 inches beyond the edge of the dish. These papers remained wet throughout the test and served as a resting place for the flies.

TRANSFERRING AND COUNTING FLIES.

Flies were transferred from the breeding cage to the experimental cages and counted as follows: A hole about five-eighths of an inch in diameter was cut in one corner of the netting which served as a

top for the breeding cages. This hole when not in use was plugged with a cork. A rug was thrown over the top of the cage so as to leave the hole just exposed. A 500 c. c. tincture mouth bottle was inverted over the hole and the flies, attracted by the light, passed into the bottle. One hundred or more flies will enter within two or three minutes. With the thumb placed over the mouth of the bottle these flies may be transferred to the experimental cage. If the thumb is then partially removed so that an opening is made just large enough for one fly to pass through at a time, the flies will leave the bottle at such a rate that they may be easily counted.

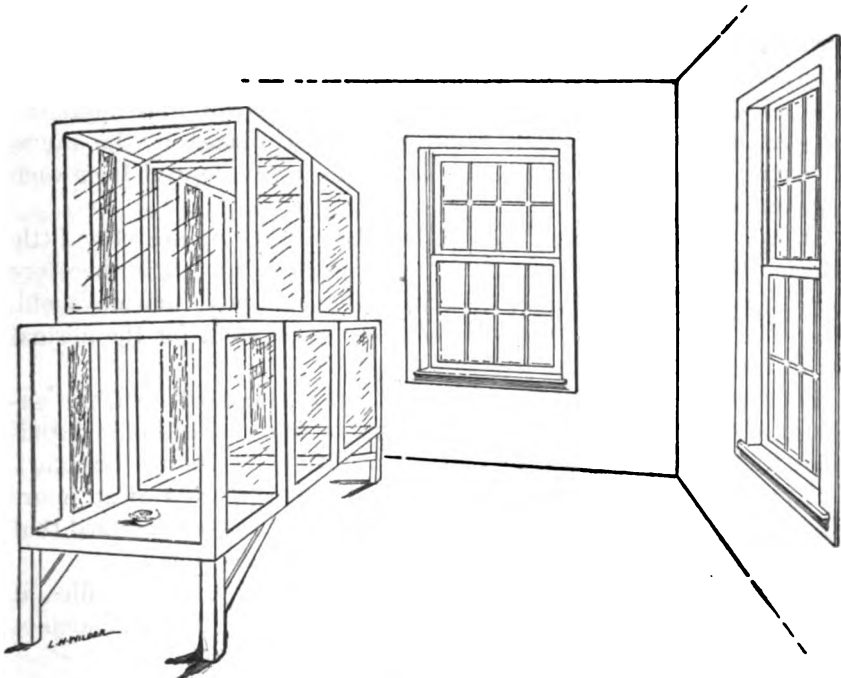


FIG. 1.—Arrangement of cages in experimental room.

STANDARD POISON SOLUTION.

Arsenic was chosen as the standard poison, because the majority of fly poisons on the market contain arsenic as the active ingredient. A series of solutions of varying concentrations of arsenic were tried, and a one-thousandth normal sodium arsenite solution was chosen as a standard, chiefly because it would kill about 50 per cent of the flies in a convenient time for laboratory tests.

The stock tenth normal arsenite solution was prepared by dissolving 4.95 grams of pure sublimed arsenious oxide (As_2O_3) and 20 grams of pure sodium carbonate in about 300 c. c. of distilled water by heating. When solution was complete, the liquid was cooled to

20° C. and the volume made up to 1,000 c. c. with distilled water. (Sutton, Volumetric Analysis, 8th ed., p. 149.)

Ten c. c. of the stock solution were diluted to 1,000 c. c. with distilled water. The resulting solution is one-thousandth normal arsenious oxide, containing 37.5 milligrams of arsenic per liter, and is referred to hereafter as the "standard arsenite solution."

PROCEDURE FOR TESTING KILLING POWER OF A MUSCICIDE.

One hundred flies of a known age were exposed in one of the experimental cages for four hours to 100 c. c. of the poison solution. At the same time and under the same conditions an equal number of flies were exposed in another cage to 100 c. c. of the standard arsenite solution. A third cage, containing 100 flies, together with moistened bread and water, served as a control. At the end of four hours the poisons were removed, and bread and water placed in the cages. Twenty hours from this time the dead flies were removed from each cage and counted.

It has been found that flies either do not eat or are very little affected by poison till after they are three days old. It is therefore best to start experimental work with flies at least four days old. Also flies more than 10 days old should not be used. for the normal death rate above that age is great.

Four hours was arbitrarily chosen as the standard time for exposing the flies to the poison. In the majority of cases this is insufficient to kill all the flies, so that quantitative results are obtained. The poison was then removed and an additional period of 20 hours allowed to elapse before making the count. It has been assumed that all flies affected by the poison would die within this time.

As temperature plays an important part in the killing of flies, it was kept as nearly constant as possible during a test and always recorded. Most of our work was done at about 32° C.

COEFFICIENT.

The ratio of the corrected mortality rate with a given poison to that with the standard arsenite solution, both rates having been corrected by the normal death rate without poison, has been taken as the coefficient of that poison. This coefficient has been found to depend also upon the age of the flies and the temperature of the experiment.

EXPERIMENTAL RESULTS.

NORMAL MORTALITY RATE.

Before proceeding with the quantitative analysis of the experimental results, it was found desirable to obtain more exact data

than were available upon the normal death rate of flies under the varying conditions of the experimental work. The literature consulted gives only average figures without specific reference to the environment and the age of the insects.

A control test was made, parallel with each of the poison tests, with flies of the same batch, exposed to a dish of water under the exact experimental conditions obtaining in the test of the poison. The numbers of flies dying in these control tests being small, there was likelihood of a considerable percentage of variation and corresponding error in the use of the control figures as corrections. On the other hand, the combined data of all the control tests are sufficient in amount to give a reasonably correct picture of the actual facts. It was decided, therefore, to utilize these data for a special study of the normal rate of dying among flies of various ages and at various temperatures and to apply this normal rate as a correction to each experiment rather than the individual rate determined with that particular experiment. By this procedure the correction actually used is based upon the results of all the controls and subject therefore to less experimental error than if the individual rate were used.

The results of all these control experiments have been brought together in Table I.

TABLE I.—Normal mortality (per cent per 24 hours) of flies.

Date.	Age.	Temperature.	Mortality per 24 hours.	Date.	Age.	Temperature.	Mortality per 24 hours.
1915.				1916.			
Nov. 9.....	4	30-35	4	Mar. 18.....	9	30.9	11
Nov. 10.....	5	30-35	4	Apr. 4.....	7	34.2	9
Nov. 11.....	6	30-35	4	Apr. 5.....	8	33.7	10
Nov. 12.....	7	30-35	7	Apr. 6.....	5	30.9	5
Nov. 29.....	10	30-35	27	Apr. 7.....	6	32.0	16
Nov. 30.....	11	30-35	25	Apr. 8.....	7	33.1	7
Dec. 17.....	7	32.0	8	Apr. 17.....	7	26.5	0
1916.				Apr. 18.....	8	24.2	6
Jan. 13.....	10	34.2	10	May 9.....	4	23.2	2
Jan. 22.....	6	33.1	1	May 11.....	6	22.7	1
Feb. 5.....	3	32.0	5	May 19.....	6	20.5	1
Feb. 28.....	8	27.5	9	May 20.....	7	21.0	2
Feb. 29.....	9	32.0	23	Do.....	7	21.0	2
Mar. 17.....	8	30.9	15	Do.....	7	21.0	1
Do.....	8	30.9	10	May 23.....	10	20.0	13
Do.....	8	30.9	10	May 24.....	11	20.0	20
Do.....	8	30.9	3	May 25.....	4	21.0	1
Do.....	8	30.9	11	May 26.....	5	22.0	0
Mar. 18.....	9	30.9	10	May 27.....	6	23.2	2
Do.....	9	30.9	15	May 31.....	10	23.2	4
Do.....	9	30.9	3	Do.....	10	23.2	3
Do.....	9	30.9	10				

Table II gives the same results averaged in groups according to ages and temperatures.

TABLE II.—*Normal mortality (per cent per 24 hours) of flies—Average experimental value arranged according to ages and temperature.*

Temperature (°C.).	Age in days.									
	2	3	4	5	6	7	8	9	10	11
20-25.....			1	0	3	2	6	.....	6	20
25-30.....										
30-35.....		5	4	5	7	8	10	12	19	25

The determinations were not numerous enough to furnish entirely consistent results, even when averaged by small groups, but the progressive variation with increasing age and rising temperature is sufficiently well marked to justify further treatment in the line of smoothing out the experimental results. Had all the control values been obtained at the same temperature and age of fly, this further treatment would be obvious, namely, a direct averaging of the results. In the case in hand a similar treatment has been applied in the construction of a table of average or most probable values extending over the experimental ranges of temperature and age. This table is given as Table III below, and the values thus obtained have been used to correct all the crude mortality rates obtained in the experimental tests.

TABLE III.—*Normal mortality (per cent per 24 hours) of flies—Most probable values arranged according to ages and temperature.*

Temperature (°C.).	Age in days.									
	2	3	4	5	6	7	8	9	10	11
20-25.....	1	1	1	2	3	3	4	6	8	14
25-30.....	3	3	3	4	5	7	9	11	.....	.....
30-35.....	5	5	6	7	8	10	13	15	18	25

PRELIMINARY SURVEY OF POSSIBLE MUSCICIDES.

Among the various substances that have been recommended for this purpose, arsenic, quassia sirup, formaldehyde, and potassium dichromate seemed to justify further study. These are variously mentioned as suitable muscicides, but no definite quantitative values have been reported. In fact, quantitative measurements of the efficiency of muscicides do not seem to have been made previous to the present study. The quassi sirup is recommended by the United States Dispensatory and is compounded as follows:

Macerate during 24 hours 1,000 parts of quassia wood (chips) with 5,000 parts of water, then boil for half an hour, set aside for 24 hours, and press. Mix the liquid with 150 parts of molasses and evaporate to 200 parts. A weaker decoction

tion of the quassia does not kill the flies. From this the fly water, or fly plate, is prepared as follows: Mix when needed and dispense without filtering 200 parts of sirup of quassia, 50 parts of alcohol, and 750 parts of water. It is used by moistening with the mixture a cloth or filtering paper on a plate.

According to Howard¹ formaldehyde was first recommended by C. H. Popenoe, of the Kansas Agricultural College, in 1903, who used a 4 per cent solution. Others have advised the use of solutions varying from a teaspoonful of formalin to a cup of water (approximately 0.5 per cent formaldehyde) to 10 per cent formaldehyde. All writers seem to agree that the formaldehyde solution is very rapid and effective in its action.

Dichromate has also been recommended without specific data either upon the proper strength or the relative efficiency.

In addition to these three substances, a number of chemical compounds were selected rather at random, with the idea of establishing promising leads by covering a considerable range of chemical types. This preliminary survey served at least to eliminate many chemical groups and indicated certain substances as worthy of further investigation. No attempt was made to make this list exhaustive, even of the larger groups of chemical substances.

The results of this preliminary study are given in Table IV, from which those substances marked with an asterisk were selected for more detailed study.

TABLE IV.—*Preliminary study of muscicides.*

Date.	Substance.	Concentration.		Temperature.	Age.	Mortality (crude).	Mortality (corrected).
			P. ct.	° C.	Days.	P. ct.	P. ct.
1916.							
Feb. 16	Aluminum chloride ($\text{Al}_2\text{Cl}_6 \cdot 12\text{H}_2\text{O}$).....	0.1 molar..	4.8	29.8	5	32	*28
	Potassium alum ($\text{Al}_2(\text{SO}_4)_3 \cdot 3 \cdot \text{K}_2\text{SO}_4 \cdot 24\text{H}_2\text{O}$).....	.....do.....	9.5	29.8	5	17	13
	Barium chloride (BaCl_2).....	.....do.....	2.1	29.8	5	4	0
	Borax ($\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$).....	.....do.....	3.8	29.8	5	13	9
	Calcium chloride (CaCl_2).....	.....do.....	1.1	29.8	5	2	0
17	Ferric chloride ($\text{Fe}_2\text{Cl}_6 \cdot 12\text{H}_2\text{O}$).....	.....do.....	5.4	33.1	6	18	10
	Lithium chloride (LiCl).....	Molar.....	4.2	33.1	6	29	21
	Magnesium sulphate ($\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$).....	0.1 molar..	2.5	33.1	6	2	0
	Manganous sulphate ($\text{MnSO}_4 \cdot 4\text{H}_2\text{O}$).....	.....do.....	2.2	33.1	6	2	0
	Sodium benzoate ($\text{NaC}_7\text{H}_5\text{O}_2$).....	.....do.....	1.4	33.1	6	29	*21
23	Sodium salicylate ($\text{NaC}_7\text{H}_5\text{O}_3$).....	.....do.....	1.6	33.1	4	65	*59
	Sodium fluoride (NaF}).....	.....do.....	.4	33.1	4	81	*75
	Sodium citrate ($2\text{Na}_2\text{C}_6\text{H}_5\text{O}_7 \cdot 11\text{H}_2\text{O}$).....	.....do.....	7.1	33.1	4	81	*25
	Sodium formate (NaCHO_2).....	.....do.....	.7	33.1	4	38	32
24	Potassium iodide (KI}).....	.....do.....	1.7	33.1	4	39	*33
	Potassium nitrate (KNO_3).....	.....do.....	1.0	34.2	5	37	*30
	Potassium chlorate (KClO_3).....	.....do.....	1.2	34.2	5	47	*40
	Sodium potassium tartrate ($\text{NaKC}_4\text{H}_4\text{O}_6 \cdot 4\text{H}_2\text{O}$).....	.....do.....	2.8	34.2	5	14	7
	Zinc chloride (ZnCl_2).....	.....do.....	1.4	34.2	5	26	19
	Saccharine ($\text{C}_6\text{H}_4 \text{CO NH SO}_3$).....	.....do.....	1.8	34.2	5	22	15

Table V gives results of further studies of the more promising substances, together with average coefficients. This work indicated three substances of decided value, namely, formaldehyde, sodium

¹ Howard, L. O., *The House Fly, Disease Carrier*, p. 185.

salicylate, and sodium fluoride. The first two of these in the concentrations used and quantities exposed would be practically harmless to man. Sodium fluoride, even in this dilution, would probably be corrosive when mixed with the hydrochloric acid of the stomach. It is not as toxic as arsenic, but would be distinctly dangerous for general household use. Therefore the formaldehyde and the sodium salicylate were chosen for a careful study under varying conditions of temperature, concentration, and other factors, with a view to their recommendation for general and especially for domestic use. The results of this more detailed study are also given in full in Table V.

TABLE V.—Detailed study of various muscicides.

ARSENITE SOLUTION, ONE THOUSANDTH NORMAL.

Date.	Age.	Temperature.	Mortality (crude).		Mortality (corrected).		Coefficient.
			Test.	Standard.	Test.	Standard.	
1915.							
Nov. 9.	4	30-35		45		39	
Nov. 10.	5	30-35		38		31	
Nov. 11.	6	30-35		55		47	
Nov. 22.	3	30-35		25		20	
Nov. 23.	4	30-35		25		19	
Nov. 26.	7	30-35		56		46	
Dec. 14.	4	30.9		20		14	
Dec. 15.	5	30.9		27		20	
Dec. 16.	6	29.8		31		26	
Dec. 17.	7	32.0		43		33	
1916.							
Jan. 7.	4	33.1		41		35	
Jan. 10.	7	32.0		29		19	
Jan. 11.	8	29.8		44		35	
Jan. 12.	9	33.1		44		29	
Jan. 20.	4	30.9		28		22	
Jan. 21.	5	33.1		59		52	
Feb. 4.	2	30.9		10		5	
Feb. 15.	4	27.5		30		27	
Feb. 26.	7	27.5		62		55	
Mar. 13.	3	33.1		29		24	
Mar. 14.	4	30.9		58		52	
Mar. 15.	5	34.7		20		13	
Mar. 16.	6	24.2		33		30	
Mar. 17.	7	27.5		31		24	
Mar. 31.	3	33.1		12		7	
Apr. 1.	4	29.8		25		22	
Apr. 3.	6	33.1		37		29	
Apr. 4.	7	34.7		75		65	
Apr. 5.	8	33.7		30		17	
Apr. 6.	5	30.9		11		4	
Apr. 15.	5	26.5		33		29	
Apr. 17.	7	26.5		28		21	
Apr. 18.	8	24.2		22		18	
Apr. 19.	4	25.5		37		34	
Apr. 20.	5	28.8		31		27	
Apr. 21.	6	35.3		44		36	
Apr. 22.	7	33.1		50		40	
Apr. 24.	4	29.8		38		35	
Apr. 25.	5	32.0		26		19	
Apr. 26.	6	32.0		30		22	
Apr. 27.	7	32.0		61		41	
May 4.	7	27.5		15		8	
May 15.	3	21.0		11		10	
May 16.	3	22.7		10		9	
May 17.	4	21.5		3		2	
May 18.	5	21.5		7		5	
Do.	5	21.5		8		6	
Do.	5	21.5		5		3	
Do.	5	21.5		5		3	
Do.	5	21.5		7		5	
May 19.	7	20.5		9		6	
May 22.	9	20.0		7		1	
Do.	10	20.0		26		21	

TABLE V.—Detailed study of various muscicides—Continued.

ARSENITE SOLUTION, ONE THOUSANDTH NORMAL.

Date.	Age.	Temperature.	Mortality (crude).		Mortality (corrected).		Coefficient.
			Test.	Standard.	Test.	Standard.	
1916.	<i>Days.</i>	<i>° C.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	
May 24.....	11	20.0	.....	13	.....	0	.....
May 25.....	4	21.0	.....	1	.....	0	.....
May 26.....	5	22.0	.....	17	.....	15	.....
May 27.....	6	23.2	.....	18	.....	15	.....
May 29.....	8	24.2	.....	12	.....	8	.....
May 31.....	10	23.2	.....	11	.....	3	.....
June 1.....	11	22.0	.....	10	.....	0	.....
June 2.....	4	22.0	.....	6	.....	5	.....
June 3.....	5	22.0	.....	1	.....	0	.....
June 5.....	7	21.5	.....	9	.....	6	.....
Average.....	.....	27.3	.....	.....	.....	21	1

ARSENITE SOLUTION, ONE HUNDREDTH NORMAL.

May 26.....	5	22.0	66	17	64	15	.....
May 27.....	6	23.0	77	18	74	15	.....
May 31.....	10	23.0	56	9	48	1	.....
Average.....	.....	22.7	.....	.....	62	10	6.2

ARSENITE SOLUTION, ONE THOUSANDTH NORMAL, IN MILK.

Apr. 4.....	7	34.0	70	75	60	65	.....
Apr. 5.....	8	33.5	15	30	2	17	.....
Do.....	8	33.5	18	30	5	17	.....
Average.....	.....	33.7	.....	.....	22	33	0.67

ALUMINUM CHLORIDE SOLUTION, 1 PER CENT.

Mar. 13.....	3	33.1	13	29	8	24	.....
Mar. 14.....	4	30.9	35	58	29	52	.....
Mar. 15.....	5	34.2	19	20	12	13	.....
Mar. 16.....	6	24.2	25	33	22	26	.....
Average.....	.....	30.6	.....	.....	18	29	0.62

SODIUM BENZOATE SOLUTION, 1 PER CENT.

Mar. 13.....	3	31.1	51	29	46	24	.....
Mar. 14.....	4	30.9	22	58	16	52	.....
Mar. 15.....	5	34.2	9	20	2	13	.....
Mar. 16.....	6	24.2	8	33	5	30	.....
Average.....	.....	30.1	.....	.....	17	29	0.59

SODIUM CHLORATE SOLUTION, 1 PER CENT.

Mar. 17.....	7	27.5	2	31	0	24	.....
Mar. 31.....	3	36.5	1	12	0	7	.....
Apr. 1.....	4	29.8	23	25	20	22	.....
Apr. 3.....	6	31.1	20	37	15	32	.....
Average.....	.....	31.2	.....	.....	9	21	0.43

SODIUM CITRATE SOLUTION, 1 PER CENT.

Mar. 13.....	3	33.1	3	29	0	24	.....
Mar. 14.....	4	30.9	8	58	2	52	.....
Mar. 15.....	5	34.2	6	20	0	13	.....
Mar. 16.....	6	24.2	16	30	13	27	.....
Average.....	.....	30.6	.....	.....	4	29	0.14

TABLE V.—*Detailed study of various muscicides—Continued.*
 POTASSIUM DICHROMATE, ONE HUNDREDTH NORMAL.

Date.	Age.	Temper- ature.	Mortality (crude).		Mortality (cor- rected).		Coef- ficient.
			Test.	Standard.	Test.	Standard.	
1915.	<i>Days.</i>	<i>° C.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	
Nov. 22.....	3	30-35	14	25	9	20	.....
Nov. 23.....	4	30-35	18	25	12	19	.....
Nov. 26.....	7	30-35	41	56	31	46	.....
Nov. 30.....	11	30-35	48	44	33	19	.....
Average.....					21	26	0.81

FORMALDEHYDE SOLUTION, ONE-HALF PER CENT.

1916.							
Feb. 25.....	6	32.0	84	39	76	31	.....
Feb. 26.....	7	27.5	80	62	73	55	.....
Do.....	7	27.5	79	62	72	55	.....
Do.....	7	27.5	79	62	72	55	.....
Do.....	7	27.5	93	62	86	55	.....
Apr. 4.....	7	34.2	77	75	67	65	.....
Apr. 7.....	6	32.0	47	38	39	30	.....
Apr. 8.....	7	33.1	60	47	50	37	.....
Apr. 17.....	7	26.5	64	28	57	21	.....
Do.....	7	26.5	34	28	37	21	.....
Do.....	7	26.5	38	28	31	21	.....
Apr. 18.....	8	24.2	54	22	50	18	.....
Do.....	8	24.2	47	22	43	18	.....
Do.....	8	24.2	58	22	54	18	.....
Apr. 19.....	4	25.5	92	37	89	34	.....
Do.....	4	25.5	76	37	73	34	.....
Do.....	4	25.5	97	37	94	34	.....
Apr. 22.....	7	33.1	77	50	67	40	.....
Apr. 24.....	4	29.8	71	38	68	35	.....
Apr. 25.....	5	32.0	56	26	49	19	.....
Apr. 26.....	6	32.0	81	30	73	22	.....
Apr. 27.....	7	32.0	80	51	70	41	.....
May 4.....	7	27.5	58	15	51	8	.....
May 15.....	2	21.0	55	11	54	10	.....
Do.....	2	21.0	57	11	56	10	.....
May 16.....	3	22.7	30	10	29	9	.....
Do.....	3	22.7	31	10	30	9	.....
May 17.....	4	21.5	25	3	24	2	.....
Do.....	4	21.5	60	3	59	1	.....
May 19.....	6	25.5	27	9	22	4	.....
May 22.....	9	20.0	36	7	20	1	.....
Do.....	9	20.0	33	7	27	1	.....
May 23.....	10	20.0	32	29	24	21	.....
May 24.....	11	20.0	28	13	14	0	.....
Do.....	11	20.0	31	13	17	0	.....
May 25.....	4	21.0	36	1	35	0	.....
May 26.....	5	22.0	48	17	46	15	.....
May 29.....	8	24.2	47	12	43	8	.....
Do.....	8	24.2	35	12	31	8	.....
Average.....		26.6			51	22	2.22

FORMALDEHYDE SOLUTION, 1 PER CENT.

Jan. 21.....	6	32.0	77	39	69	31	.....
Feb. 4.....	2	30.9	59	10	54	5	.....
Feb. 15.....	4	27.5	60	30	57	27	.....
Do.....	4	27.5	68	30	65	27	.....
Do.....	4	27.5	72	30	69	27	.....
Do.....	4	27.5	76	30	73	27	.....
Feb. 25.....	5	33.1	79	59	72	52	.....
Average.....		29.4			66	28	2.36

FORMALDEHYDE SOLUTION, 4 PER CENT.

Jan. 7.....	4	33.1	69	41	63	35	.....
Jan. 10.....	7	32.0	44	29	34	20	.....
Jan. 11.....	8	29.8	43	44	34	26	.....
Jan. 12.....	9	33.1	72	44	57	29	.....
Average.....		32.0			47	27	1.74

TABLE V.—*Detailed study of various muscicides—Continued.*

FORMALDEHYDE SOLUTION, 8 PER CENT.

Date.	Age.	Temperature.	Mortality (crude).		Mortality (corrected.)		Coefficient.
			Test.	Standard.	Test.	Standard.	
1916.	<i>Days.</i>	<i>° C.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	
Jan. 20.....	4	30.9	23	28	17	22	.....
Average.....		30.9	.....	.....	17	22	0.77

FORMALDEHYDE SOLUTION, ONE-HALF PER CENT+MOLASSES, 10 PER CENT.

Apr. 7.....	6	32.0	52	38	44	30	.....
Do.....	6	32.0	74	38	66	30	.....
Do.....	6	32.0	35	38	27	30	.....
Apr. 22.....	7	33.1	47	50	37	40	.....
Apr. 24.....	4	29.8	50	38	47	35	.....
Average.....		31.8	.....	.....	44	33	1.33

FORMALDEHYDE SOLUTION, ONE-HALF PER CENT+BROWN SUGAR, 10 PER CENT.

Apr. 8.....	7	33.1	79	47	69	37	.....
Do.....	7	33.1	62	47	52	37	.....
Do.....	7	33.1	52	47	42	37	.....
Apr. 25.....	5	32.0	59	28	52	19	.....
Apr. 26.....	6	32.0	64	30	56	22	.....
Apr. 27.....	7	32.0	64	51	54	41	.....
Average.....		32.6	.....	.....	54	32	1.69

PARAFORMALDEHYDE (DRY POWDER).

May 5.....	8	24.2	6	32	2	28	.....
Do.....	8	24.2	10	32	6	28	.....
Average.....		24.2	.....	.....	4	28	0.14

PARAFORMALDEHYDE (SATURATED SOLUTION).

May 5.....	8	24.2	30	32	26	28	.....
June 5.....	7	21.5	23	9	20	6	.....
Do.....	7	21.5	14	9	11	6	.....
Do.....	7	21.5	19	9	16	6	.....
Do.....	7	21.5	24	9	21	6	.....
Average.....		22.0	.....	.....	19	10	1.90

SODIUM FLUORIDE SOLUTION, 1 PER CENT.

Mar. 17.....	7	27.5	65	31	58	24	.....
Mar. 31.....	3	36.2	51	12	46	7	.....
Apr. 1.....	4	29.8	89	25	86	22	.....
Apr. 3.....	6	33.1	86	37	78	29	.....
Average.....		31.7	.....	.....	67	21	3.19

POTASSIUM IODIDE SOLUTION, 1 PER CENT.

Mar. 17.....	7	27.5	2	31	0	24	.....
Mar. 31.....	3	36.2	2	12	0	7	.....
Apr. 1.....	4	29.8	55	25	52	22	.....
Apr. 3.....	6	33.1	13	37	5	29	.....
Average.....		31.7	.....	.....	14	21	0.67

TABLE V.—Detailed study of various muscicides—Continued.

POTASSIUM NITRATE SOLUTION, 1 PER CENT.

Date.	Age.	Temperature.	Mortality (crude).		Mortality (corrected).		Coefficient.
			Test.	Standard.	Test.	Standard.	
1916.	Days.	° C.	Per cent.	Per cent.	Per cent.	Per cent.	
Mar. 17.....	7	27.5	20	31	13	24	.....
Mar. 31.....	3	36.2	1	12	0	7	.....
Apr. 1.....	4	29.8	9	25	6	22	.....
Apr. 3.....	6	33.1	15	37	7	29	.....
Average.....		31.7			7	21	0.33

QUASSIA SIRUP (RECOMMENDED BY UNITED STATES DISPENSATORY).

1915.							
Dec. 14.....	4	30.9	4	20	0	14	.....
Dec. 15.....	5	30.9	15	27	8	20	.....
Dec. 16.....	6	29.8	9	31	4	26	.....
Average.....		30.5			4	20	0.20

SODIUM SALICYLATE SOLUTION, 1 PER CENT.

1916.							
Mar. 13.....	3	33.1	34	29	29	24	.....
Mar. 14.....	4	30.9	48	58	42	52	.....
Mar. 15.....	5	34.2	54	20	47	13	.....
Mar. 16.....	6	24.2	62	33	59	30	.....
Apr. 15.....	5	26.5	36	33	32	29	.....
Apr. 19.....	4	25.5	45	37	42	34	.....
Apr. 20.....	5	28.8	78	31	74	27	.....
Do.....	5	28.8	55	31	51	27	.....
Do.....	5	28.8	52	31	48	27	.....
Do.....	5	28.8	40	31	36	27	.....
Apr. 21.....	6	35.3	43	44	35	36	.....
Do.....	6	35.3	29	44	21	36	.....
Do.....	6	35.3	31	44	23	36	.....
Do.....	6	35.3	43	44	35	36	.....
Apr. 22.....	7	33.1	55	50	45	40	.....
Apr. 24.....	4	29.8	74	38	71	35	.....
Apr. 25.....	5	32.0	43	26	36	19	.....
Apr. 26.....	6	32.0	56	30	48	22	.....
Apr. 27.....	7	32.0	55	51	45	41	.....
Average.....		31.0			43	31	1.30

SODIUM SALICYLATE SOLUTION, 1 PER CENT+BROWN SUGAR, 10 PER CENT.

Apr. 15.....	5	26.5	45	33	41	29	.....
Apr. 25.....	5	32.0	66	26	59	19	.....
Apr. 26.....	6	32.0	63	30	55	22	.....
Apr. 27.....	7	32.0	44	51	34	41	.....
May 15.....	2	21.0	51	11	50	10	.....
Do.....	2	21.0	74	11	73	10	.....
May 17.....	4	21.5	7	3	6	2	.....
Do.....	4	21.5	13	3	12	2	.....
May 19.....	6	20.5	46	9	43	6	.....
May 22.....	9	20.0	51	7	45	1	.....
Do.....	9	20.0	29	7	23	1	.....
May 23.....	10	20.0	28	29	20	21	.....
Do.....	10	20.0	52	29	44	23	.....
May 24.....	11	20.0	12	13	0	0	.....
May 25.....	4	21.0	28	1	27	0	.....
Do.....	4	21.0	14	1	13	0	.....
May 26.....	5	22.0	25	17	23	15	.....
May 27.....	5	22.0	15	18	13	16	.....
May 29.....	8	24.2	28	12	24	8	.....
Do.....	8	24.2	28	12	24	8	.....
Average.....		23.1			32	12	2.06

TABLE V.—*Detailed study of various muscicides*—Continued.
SODIUM SALICYLATE SOLUTION, 1 PER CENT+MOLASSES, 10 PER CENT.

Date.	Age.	Temper- ature.	Mortality (crude).		Mortality (cor- rected).		Coef- ficient.
			Test.	Standard.	Test.	Standard.	
1916.	<i>Days.</i>	<i>° C.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	
Apr. 15.....	5	26.5	25	33	21	29	.....
Do.....	5	26.5	12	33	8	29	.....
Apr. 22.....	7	33.1	54	50	44	40	.....
Apr. 24.....	4	29.8	54	38	51	35	.....
Average.....	.....	29.0	.....	.....	31	33	0.94

SPECIAL STUDY OF CERTAIN MUSCIDES.

Temperature effect.—The study of these substances was carried out over the period from February 25, 1916, to June 1, 1916. Up to May 4, 1916, the building where the experiments were conducted was artificially heated to an average temperature of 30.6° C., but on that date the heat was shut off. Immediately following this the outside temperature dropped and for a period of three weeks the tests were carried out at a temperature which averaged 21.9° C. A marked difference in the effect of the poisons was noticed with the lowering of the temperature. Tests were made of the formaldehyde, sodium salicylate, and arsenic at the lower temperature. A comparison of the corrected average mortalities due to the standard arsenic and the two poisons at the two ranges of temperature is given in Table VI, computed from the original data of Table V.

TABLE VI.—*Temperature effect upon the relative efficiency of certain muscicides.*

Muscicide.	Average tempera- ture.	Average mortality, corrected.	Decrease at lower tempera- ture.
	<i>° C.</i>	<i>Per cent.</i>	<i>Per cent.</i>
Standard arsenite solution.....	30.6	25	76.0
	21.9	6	
0.5 per cent formaldehyde.....	28.5	63	46.0
	21.7	34	
1 per cent sodium salicylate + 10 per cent brown sugar.....	30.6	47	42.5
	21.2	27	

This rapid and disproportionate decrease in the effect of the arsenite standard has the result of raising the coefficient of the other substances at lower temperatures. This necessitates the arbitrary selection of a fixed temperature for any standard comparative work. It is preferred, in the present discussion, however, to state both the coefficient obtained and the actual temperature of the test, and to interpret the result in the light of the facts just given rather than to attempt to reduce the coefficients to a standard temperature.

Most effective concentration of formaldehyde.—With the wide variation in the concentrations of formaldehyde recommended for use, the need of determining the most effective strength was at once apparent. A series of tests were made, using concentrations varying from 0.062 per cent to 1 per cent. Table VII shows the results of this special series. For comparison data from Table V with 4 and 8 per cent formaldehyde are also included.

TABLE VII.—*Effect of concentration of formaldehyde on its killing power.*

Date.	Age.	Temperature.	Concentration.	Mortality (crude).		Mortality (corrected).		Coefficient.
				Test.	Standard.	Test.	Standard.	
1916.	<i>Days.</i>	<i>° C.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	
Feb. 25.....	6	32.0	0.062	16	39	8	31	0.26
Do.....	6	32.0	.125	24	39	16	31	.52
Do.....	6	32.0	.25	56	39	48	31	1.55
Do.....	6	32.0	.5	84	39	76	31	2.45
Do.....	6	32.0	1.0	77	39	69	31	2.22
			4.0	(1)	(1)	47	27	1.74
			8.0	(1)	(1)	17	22	.77

¹ See Table V.

From this single set of results it appears that the most effective range of concentration is from 0.5 to 1 per cent. The slight superiority of the lower concentration is of little significance, and it will be seen later that it disappears in a more extensive series. Below this concentration insufficient substance is taken to kill and in more concentrated solutions the odor is apparently strong enough to be repellant.

Attractiveness.—It is a matter of some interest in the study of a muscicide whether it is specifically attractive or repellant to flies. It may be assumed that a fly will drink, under stress of necessity, from a solution that is normally repellant. Under normal conditions, however, there are usually alternative drinking places, and a successful poison must be at least nonrepellant and preferably attractive. Formaldehyde in a concentration of from 0.5 to 1 per cent has a decided odor, which, however, does not appear to be repellant to the flies. On the contrary, the following experiment furnishes some evidence that this odor is actually attractive. Four cages, each containing 100 flies 7 days old, were arranged in the usual manner. In each cage there was placed a dish of 0.5 per cent formaldehyde. In cage No. 2 there was placed also a dish of tap water, in cage No. 3 two dishes of tap water, and in cage No. 4 three dishes of tap water. The temperature during the test was 29.8° C.

The experiment was based upon the following reasoning: If the formaldehyde is neither attractive nor repellant, then the flies will drink from the various dishes at random, their selection in the long

run being governed wholly by the law of chance. Of the total opportunities for drinking, all are poisonous in cage No. 1, one-half in cage No. 2, one-third in cage No. 3, and one-fourth in cage No. 4. If the law of chance is alone at work, therefore, the relative numbers killed should be in the same proportion, namely, 1, 0.5, 0.33, 0.25, respectively. Table VIII gives the results obtained and for comparison, the computed results based upon the reasoning employed above. In each case there is actually a higher death rate than that computed.

TABLE VIII.—*Test of attractiveness of 0.5 (per cent) formaldehyde solution.*

Cage.	Mortality (per cent).		
	Crude.	Cor- rected.	Theoret- ical.
1	58	51	51
2	39	32	26
3	26	19	17
4	22	15	13

This evidence is, of course, quite limited, but it is consistent, and points toward the fact that there is at least no repellant action and probably a slight attractiveness in the odor of formaldehyde.

The action of formaldehyde of this strength is very rapid. Upon a number of occasions it was actually noted that approximately three minutes elapsed between the drinking of the solution and death. The considerations of the experiment just cited are therefore not complicated by the possibility of the flies drinking, on the average, more than once within the four-hour period.

A similar test of the attractiveness of a 1 per cent sodium salicylate solution was also made. Five-day old flies were used. The room temperature during the test was 32.5° C. The results obtained, and for comparison, the computed results based upon the law of chance, are given in Table IX.

TABLE IX.—*Test of attractiveness of 1 per cent sodium salicylate solution.*

Cage.	Mortality (per cent).		
	Crude.	Cor- rected.	Theoret- ical.
1	41	34	34
2	11	4	17
3	14	7	11
4	8	1	9

The evidence in this case is decidedly negative. It is safe to say that a 1 per cent solution of sodium salicylate is somewhat repellant and that the flies prefer water. The increase in the killing coefficient

brought about by the addition of brown sugar is no doubt due to the neutralizing of this repellant action. Reference to Table V will show this effect. The coefficient without sugar was 1.39 and with 10 per cent of sugar added 1.67, both at 31° C.

Comparison with commercial arsenic papers.—In order to compare the formaldehyde and sodium salicylate solutions with the commercial fly poisons on the market, samples of four different poison fly papers were prepared according to the directions which accompanied them. These solutions were tested by the standard procedure with the results shown in Table X.

TABLE X.—*Test on commercial arsenic fly poison prepared as directed on the label.*

Date.	Sample No.	Temperature.	Age of flies.	Mortality (crude).	Mortality (corrected).
		^{° C.}	^{Days.}	^{Per cent.}	^{Per cent.}
1916.					
June 1.....	1	22.0	11	32	18
Do.....	2	22.0	11	13	0
June 2.....	3	22.0	4	65	64
Do.....	4	22.0	4	47	46

The percentage of flies killed by the commercial papers is no greater, at least, than the percentage killed under similar conditions by either the formaldehyde or the sodium salicylate, and with some papers it is distinctly less.

SUMMARY OF EXPERIMENTAL RESULTS.

Two solutions, formaldehyde in 0.5 to 1 per cent, and sodium salicylate in 1 per cent concentration, have been found to be at least as efficacious as the customary arsenic preparations. The efficiencies are from two to three times that of the standard arsenite solution at summer temperatures and do not suffer the marked lowering at lower temperatures so strikingly shown in the cases of the arsenite. Both are safe for domestic use. The formaldehyde is slightly more efficient as a muscicide. The salicylate is more readily prepared and more permanent, being nonvolatile, and does not involve the keeping on hand of a rather powerful and objectionable substance.

PRACTICAL INTERPRETATION OF CORRECTED MORTALITY FIGURES.

NUMERICAL.

While the mortality figures obtained by the use of the various poisons are important in that they give a means of ready comparison, they do not show directly the percentage of flies which would be killed daily under conditions similar to those of the test. An attempt has therefore been made to determine this relation. All

of these tests were started between 9.30 and 12 a. m. and finished between 1.30 and 4 p. m. There is no evidence to show that this period was typical of the 24 hours of the day or that similar results would be obtained at an earlier or a later period of the day.

Cages containing one hundred 4 to 5 day old flies each were exposed to a solution containing 1 per cent sodium salicylate plus 10 per cent brown sugar for 4-hour periods beginning at 4 a. m. and ending at 8 p. m. The test was conducted on May 9, 1916, at a temperature of 23.2° C. Up to the time the solutions were exposed the flies had free access to food and water. The counts were made during the following day. The results of the test are as follows:

TABLE XI.—*Mortality rate as a function of time of day.*

Time of day exposed.	Mortality (crude).	Mortality (corrected).	Daily mortality.
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
4 a. m. to 8 a. m.	34	33	45.8
8 a. m. to 12 noon.	24	23	32.0
12 noon to 4 p. m.	8	7	9.7
4 p. m. to 8 p. m.	10	9	12.5

Averaging the corrected mortalities from 8 a. m. to 4 p. m., a mortality of 15 per cent is obtained. As this is the time during which all of the tests of the various poisons were made, it is seen that had the tests been made between 4 and 8 a. m. the percentage of mortality would have been increased approximately two-fold. If the determinations had been made between 4 and 8 p. m. only one-half as many would have died. Assuming, as seems probable, that the feeding between 8 p. m. and 4 a. m. is negligible, the average mortality rate for the 24 hours is 12 per cent per 4 hours, a value in sufficient agreement with the average value of 15 per cent obtained above to justify the assumption that the mortality rates here obtained are approximately correct mean values over a 24-hour period. The consecutive application of a mortality rate of 12 per cent per 4 hours to a fixed population gives a total rate per 24 hours of 53 per cent. For convenience the relation between certain 4-hour and the corresponding 24-hour mortality rates is given:

Equivalent mortality rates.

4 hours.	24 hours.
<i>Per cent.</i>	<i>Per cent.</i>
10	47
20	74
30	88
40	95
50	99

A further consideration in applying these results is the relative proportion of the total floor areas available and the size of the poison-containing dish. It will readily be seen that the dish in these experiments occupied a relatively large proportion of the available floor and wall space. In a larger room the relative size of the dish would be smaller in proportion, and the chance of a fly alighting near it by accident correspondingly reduced.

This factor is partially offset, on the other hand, by the factor of attractiveness.

ATTRACTIVE AGENTS.

On comparing the results of the killing effect of the simple poison solutions and those also containing substances which are known to

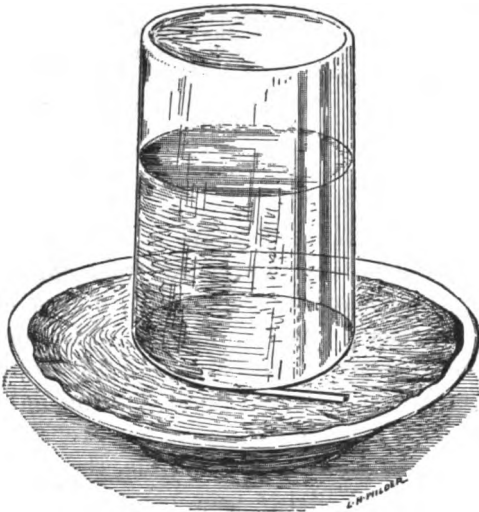


FIG. 2.—Container for fly poison.

attract flies, such as sugar, molasses, or milk, it is frequently found that the coefficient is lower when the "attractive" agent is present. On the face of this evidence it would seem that no benefit was derived by the addition of such substances. Under the conditions of the test the surface of the poison solution is a much greater percentage of the total area of the floor space than it would be in practical use. Also the flies are more congested than would generally

be the case. Whether the solution has any attractiveness or not, all the flies will no doubt find it in the course of four hours. The decrease in killing coefficient in these cases, therefore, means a decrease in actual toxicity of the solution caused by the addition of the organic matter. In connection with what has been said concerning the size of the room it is to be noted that increased attractiveness would be more noticeable in a larger room and might offset to a large extent the factor of decreased relative size of the dish.

USE OF MUSCICIDES.

PREPARATION OF SOLUTIONS.

For use in the household a formaldehyde solution of approximately the correct strength may be made by adding 3 teaspoonfuls of the concentrated formaldehyde solution, commercially known as

formalin, to a pint of water. Similarly, the proper concentration of sodium salicylate may be obtained by dissolving 3 teaspoonfuls of the pure chemical (a powder) to a pint of water.

As commercial formaldehyde solution, on account of its strong odor, is not easily handled, it is suggested that druggists and drug houses prepare a 1 per cent solution for this purpose and retail it at a relatively low cost. It is also suggested that the sodium salicylate might be sold in the form of a concentrated solution with directions for diluting to 1 per cent, or possibly sheets of absorbent paper impregnated with a known amount of the dry substance, similar to the arsenic papers now on the market, might be sold.

CONTAINERS FOR SOLUTIONS.

A container such as is shown in Figure II has been found convenient for automatically keeping the solution always available for flies to drink. An ordinary, thin-walled drinking glass is filled or partially filled with the solution. A saucer, or small plate in which is placed a piece of white blotting paper cut the size of the dish, is put bottom up over the glass. The whole is then quickly inverted, a match placed under the edge of the glass, and the container is ready for use. As the solution dries out of the saucer the liquid seal at the edge of the glass is broken and more liquid flows into the lower receptacle. Thus the paper is always kept moist.

STICKY FLY PAPERS.

The experimental work done on sticky fly preparations had for its object the study of the compounding of a sticky preparation having attractive properties, and the comparison of the sticky and poison preparations as to their efficiency as fly killers.

COMPOUNDING AND TESTING OF STICKY FLY PREPARATIONS.

In general, sticky preparations have for their basis a solution of rosin in an oil. A number of oils were tried, mixed with both white and grade E rosin. The selection of oils was made with partial reference to their possible attractiveness. The cheaper impure rosin was eliminated after a few tests, for it was found that the impurities contained in it prohibited the obtaining of a homogeneous mixture of the rosin and oil, and some evidence was also obtained that the strong odor of the crude rosin had more of a repellant action than that which originated from the purer product.

The sticky substance was heated in boiling water till it became fluid. It was then spread over 6-inch squares of unsized manila wrapping paper. These papers were made in triplicate, and were placed on the floor of the fly breeding room where the flies were

very numerous, and were left exposed from 2 p. m. to 9.30 a. m. of the following day. They were then removed and a count made of the catch.

Table XII gives the preparations used and the results obtained.

TABLE XII.—*Results of tests on sticky preparations.*

Date.	Preparation No.	Oil.		White rosin parts by weight.	Flies caught (average).
		Kind.	Parts by weight.		
1915.					
Dec. 9	1.....	Castor.....	2	5	25
9	2.....	Olive.....	2	5	1
9	3.....	Lard.....	2	5	8
9	4.....	Sperm.....	2	5	1
9	5.....	Sturgeon.....	2	5	1
9	6.....	Cod liver.....	2	5	1
9	7.....	"Fish".....	2	5	7
9	Commercial.....				25
10	8.....	Castor.....	2	10	3
10	9.....	Olive.....	2	10	1
10	10.....	Lard.....	2	10	0
10	11.....	Sperm.....	2	10	3
10	12.....	Sturgeon.....	2	10	5
10	13.....	Cod liver.....	2	10	5
10	14.....	"Fish".....	2	10	4
10	Commercial.....				32
11	15.....	Castor.....	4	10	38
11	16.....	do.....	5	10	61
11	Commercial.....				55

It is seen that the castor-oil preparations are far superior to the others. Preparation No. 16, composed of 1 part by weight of castor oil and 2 parts of white rosin, is the most satisfactory. This mixture gives as good results as the common sticky preparation on the market.

These experiments have not disclosed, therefore, any advantage in the use of supposedly attractive oils.

IMPROVEMENTS IN HANDLING STICKY PREPARATIONS.

It is believed, however, that certain improvements are possible in the manner of handling these preparations with a view to making them less objectionable both as to appearance and as to danger of accidental contact with clothing, furniture, and books. The preparation No. 16 can be diluted with a small amount of ether and put up in liquid form in a bottle. This liquid is readily applied to a plate or cup and can be removed in boiling water with washing powder. While this particular solvent is not free from objections, its price being one, it is believed that the manufacture of a suitable liquid preparation, for such use as is indicated, would lead to the increased use of sticky preparations.

A semi-inclosed container, to the inside of which the preparation could be applied, would also be a distinct improvement from an

esthetic viewpoint and would permit the use of attractive agents to increase further the efficiency of the device.

COMPARISON OF EFFICIENCIES OF STICKY PAPERS AND MUSCICIDES.

Tests were conducted to determine the relative efficiency of the sticky paper and the muscicides. Squares of commercial sticky paper and dishes of poison solution having the same area were exposed in separate experimental cages to flies under standard conditions. The following results were obtained:

Temperature, ° C.	22.7
Mortality, per cent (corrected):	
0.5 per cent formaldehyde.....	34.0
1 per cent sodium salicylate+10 per cent brown sugar.....	33.0
Sticky paper.....	14.0

About two and one-half times as many flies were killed by the muscicides as by the sticky papers under the conditions of the experiment.

SUMMARY AND CONCLUSIONS.

The use of muscicides or fly poison preparations has many distinct advantages over other methods of combating the fly nuisance within the household. A serious drawback to this method has heretofore been the extremely poisonous character of the substances available and the consequent danger, especially to children, attending their use.

A somewhat comprehensive survey has been made of other chemical substances having possible muscicidal properties with a view to substituting them for the arsenic preparations now commonly employed.

This study has necessitated the development of an experimental technique for the determination of relative muscicidal efficiencies of various preparations. The procedures developed permit the determination of a relative coefficient, one thousandth normal sodium arsenite, serving as a standard basis of comparison.

Of the substances frequently recommended, potassium dichromate and quassia sirup have been found to be of little value. Formaldehyde, on the other hand, when properly employed has been found to be much more efficient than the standard arsenite solution. The studies have indicated the most efficient strength of the formaldehyde solution to be from 0.5 to 1 per cent, which is equivalent to 1.25 to 2.5 per cent of the 40 per cent solution sold as formalin.

A muscicide of almost equal efficiency and of distinctly superior qualities in many ways has been found in the substance sodium salicylate, a 1 per cent aqueous solution of which is recommended.

At midsummer temperatures the efficiency of either of these preparations is slightly greater than that of solutions prepared from commercial poison papers. Directions for preparing these solutions in the household and recommendations for their commercial preparation and sale are made.

Sticky fly papers have been investigated with special reference to a possible improvement in their quality by giving them added attractiveness to flies and the question of a more suitable manner of use has been discussed. No improvements have been discovered in the direction of efficiency. It has been found possible to prepare a liquid compound which can be used in more convenient and less unsightly containers than those at present employed, and the preparation and marketing of some similar compound upon the part of those engaged in the manufacture of the present papers is recommended. The relative efficiencies of the sticky preparations and the muscicides have been studied and, on the basis of equal areas exposed, the latter have been found to be several times as efficient under the experimental conditions.

ACKNOWLEDGMENTS.

The sticky compounds used in these studies were prepared by Mr. Elias Elvove, technical assistant, Hygienic Laboratory, to whom the authors' thanks are expressed and to whom they are indebted also for an extensive survey of the literature bearing upon this question. In the experimental portion of the work valuable assistance has been rendered by Mr. A. A. Moore, laboratory attendant, which is also gratefully acknowledged.

HYGIENIC LABORATORY BULLETINS OF THE PUBLIC HEALTH SERVICE.

The Hygienic Laboratory was established in New York, at the Marine Hospital on Staten Island, August, 1887. It was transferred to Washington, with quarters in the Butler Building, June 11, 1891; and a new laboratory building, located in Washington, was authorized by act of Congress March 3, 1901.

The following *bulletins* [Bulls. Nos. 1-7, 1900 to 1902, Hyg. Lab., U. S. Mar.-Hosp. Serv., Wash.] have been issued:

*No. 1.—Preliminary note on the viability of the *Bacillus pestis*. By M. J. Rosenau.

No. 2.—Formalin disinfection of baggage without apparatus. By M. J. Rosenau.

*No. 3.—Sulphur dioxide as a germicidal agent. By H. D. Geddings.

*No. 4.—Viability of the *Bacillus pestis*. By M. J. Rosenau.

No. 5.—An investigation of a pathogenic microbe. (*B. typhi murium* Danyz applied to the destruction of rats.) By M. J. Rosenau.

*No. 6.—Disinfection against mosquitoes with formaldehyde and sulphur dioxide. By M. J. Rosenau.

†No. 7.—Laboratory technique: Ring test for indol, by S. B. Grubbs and Edward Francis; Collodium sacs, by S. B. Grubbs and Edward Francis; Microphotography with simple apparatus, by H. B. Parker.

By act of Congress approved July 1, 1902, the name of the "United States Marine-Hospital Service" was changed to the "Public Health and Marine-Hospital Service of the United States," and three new divisions were added to the Hygienic Laboratory.

Since the change of name of the service the bulletins of the Hygienic Laboratory have been continued in the same numerical order, as follows:

*No. 8.—Laboratory course in pathology and bacteriology. By M. J. Rosenau. (Revised edition, March, 1904.)

*No. 9.—Presence of tetanus in commercial gelatin. By John F. Anderson.

*No. 10.—Report upon the prevalence and geographic distribution of hookworm disease (uncinariasis or anchylostomiasis) in the United States. By Ch. Wardell Stiles.

*No. 11.—An experimental investigation of *Trypanosoma lewisi*. By Edward Francis.

*No. 12.—The bacteriological impurities of vaccine virus; an experimental study. By M. J. Rosenau.

*No. 13.—A statistical study of the intestinal parasites of 500 white male patients at the United States Government Hospital for the Insane; by Philip E. Garrison, Brayton H. Ransom, and Earle C. Stevenson. A parasitic roundworm (*Agamomermis culicis* n. g., n. sp.) in American mosquitoes (*Culex sollicitans*); by Ch. Wardell Stiles. The type species of the cestode genus *Hymenolepis*, by Ch. Wardell Stiles.

*No. 14.—Spotted fever (tick fever) of the Rocky Mountains; a new disease. By John F. Anderson.

*No. 15.—Inefficiency of ferrous sulphate as an antiseptic and germicide. By Allan J. McLaughlin.

*No. 16.—The antiseptic and germicidal properties of glycerin. By M. J. Rosenau.

*No. 17.—Illustrated key to the trematode parasites of man. By Ch. Wardell Stiles.

*No. 18.—An account of the tapeworms of the genus *Hymenolepis* parasitic in man, including reports of several new cases of the dwarf tapeworm (*H. nana*) in the United States. By Brayton H. Ransom.

*No. 19.—A method for inoculating animals with precise amounts. By M. J. Rosenau.

*No. 20.—A zoological investigation into the cause, transmission, and source of Rocky Mountain "spotted fever." By Ch. Wardell Stiles.

*No. 21.—The immunity unit for standardizing diphtheria antitoxin (based on Ehrlich's normal serum). Official standard prepared under the act approved July 1, 1902. By M. J. Rosenau.

*No. 22.—Chloride of zinc as a deodorant, antiseptic, and germicide. By T. B. McClintic.

*No. 23.—Changes in the pharmacopœia of the United States of America. Eighth Decennial Revision. By Reid Hunt and Murray Galt Motter.

No. 24.—The international code of zoological nomenclature as applied to medicine. By Ch. Wardell Stiles.

*No. 25.—Illustrated key to the cestode parasites of man. By Ch. Wardell Stiles.

*No. 26.—On the stability of the oxidases and their conduct toward various reagents. The conduct of phenolphthalein in the animal organism. A test for saccharin, and a simple method of distinguishing between cumarin and vanillin. The toxicity of ozone and other oxidizing agents to lipase. The influence of chemical constitution on the lipolytic hydrolysis of ethereal salts. By J. H. Kastle.

*No. 27.—The limitations of formaldehyde gas as a disinfectant, with special reference to car sanitation. By Thomas B. McClintic.

*No. 28.—A statistical study of the prevalence of intestinal worms in man. By Ch. Wardell Stiles and Philip E. Garrison.

*No. 29.—A study of the cause of sudden death following the injection of horse serum. By M. J. Rosenau and John F. Anderson.

†No. 30.—I. Maternal transmission of immunity to diphtheria toxine. II. Maternal transmission of immunity to diphtheria toxine and hypersusceptibility to horse serum in the same animal. By John F. Anderson.

†No. 31.—Variations in the peroxidase activity of the blood in health and disease. By Joseph H. Kastle and Harold L. Amoss.

†No. 32.—A stomach lesion in guinea pigs caused by diphtheria toxine and its bearing upon experimental gastric ulcer. By M. J. Rosenau and John F. Anderson.

*No. 33.—Studies in experimental alcoholism. By Reid Hunt.

†No. 34.—I. *Agamoflaria georgiana* n. sp., an apparently new roundworm parasite from the ankle of a negress. II. The zoological characters of the roundworm genus *Filaria* Mueller, 1787. III. Three new American cases of infection of man with horsehair worms (species *Paragordius varius*), with summary of all cases reported to date. By Ch. Wardell Stiles.

†No. 35.—Report on the origin and prevalence of typhoid fever in the District of Columbia. By M. J. Rosenau, L. L. Lumsden, and Joseph H. Kastle. (Including articles contributed by Ch. Wardell Stiles, Joseph Goldberger, and A. M. Stimson.)

†No. 36.—Further studies upon hypersusceptibility and immunity. By M. J. Rosenau and John F. Anderson.

†No. 37.—Index-catalogue of medical and veterinary zoology. Subjects: Trematoda and trematode diseases. By Ch. Wardell Stiles and Albert Hassall.

No. 38.—The influence of antitoxin upon post-diphtheritic paralysis. By M. J. Rosenau and John F. Anderson.

†No. 39.—The antiseptic and germicidal properties of solutions of formaldehyde and their action upon toxines. By John F. Anderson.

†No. 40.—1. The occurrence of a proliferating cestode larva (*Sparganum proliferum*) in man in Florida, by Ch. Wardell Stiles. 2. A reexamination of the type specimen of *Filaria restiformis* Ledy, 1880=*Agramomermis restiformis*, by Ch. Wardell Stiles. 3. Observations on two new parasitic trematode worms: *Homalogaster philippinensis* n. sp., *Agamodistomum nanus* n. sp., by Ch. Wardell Stiles and Joseph Goldberger. 4. A reexamination of the original specimen of *Tania saginata abietina* (Weinland, 1858), by Ch. Wardell Stiles and Joseph Goldberger.

†No. 41.—Milk and its relation to the public health. By various authors.

†No. 42.—The thermal death points of pathogenic microorganisms in milk. By M. J. Rosenau.

†No. 43.—The standardization of tetanus antitoxin (an American unit established under authority of the act of July 1, 1902). By M. J. Rosenau and John F. Anderson.

No. 44.—Report No. 2 on the origin and prevalence of typhoid fever in the District of Columbia, 1907. By M. J. Rosenau, L. L. Lumsden, and Joseph H. Kastle.

†No. 45.—Further studies upon anaphylaxis. By M. J. Rosenau and John F. Anderson.

No. 46.—*Hepatozoon perniciosum* (n. g., n. sp.); a hæmogregarine pathogenic for white rats; with a description of the sexual cycle in the intermediate host, a mite (*Ielaps echidnimus*). By W. W. Miller.

No. 47.—Studies on Thyroid: I. The relation of iodine to the physiological activity of thyroid preparations. By Reid Hunt and Atherton Seidell.

No. 48.—The physiological standardization of digitalis. By Charles Wallis Edmunds and Worth Hale.

No. 49.—Digest of comments on the United States pharmacopœia. Eighth decennial revision for the period ending December 31, 1905. By Murray Galt Motter and Martin I. Wilbert.

No. 50.—Further studies upon the phenomenon of anaphylaxis. By M. J. Rosenau and John F. Anderson.

No. 51.—Chemical tests for blood. By Joseph H. Kastle.

No. 52.—Report No. 3 on the origin and prevalence of typhoid fever in the District of Columbia (1908). By M. J. Rosenau, Leslie L. Lumsden, and Joseph H. Kastle.

No. 53.—The influence of certain drugs upon the toxicity of acetanilide and antipyrine. By Worth Hale.

No. 54.—The fixing power of alkaloids on volatile acids and its application to the estimation of alkaloids with the aid of phenolphthalein or by the Volhard method. By Elias Elvove.

No. 55.—Quantitative pharmacological studies; adrenalin and adrenalinlike bodies. By W. H. Schultz.

No. 56.—Milk and its relation to the public health. (Revised edition of Bulletin No. 41.) By various authors.

No. 57.—I. The presence of tubercle bacilli in the circulating blood in clinical and experimental tuberculosis. By John F. Anderson. II. The viability of the tubercle bacillus. By M. J. Rosenau.

No. 58.—Digest of comments on the pharmacopœia of the United States of America (eighth decennial revision) and the national formulary for the period ending December 31, 1906. By Murray Galt Motter and Martin I. Wilbert.

No. 59.—The oxidases and other oxygen catalysts concerned in biological oxidations. By Joseph Hoeing Kastle.

No. 60.—A study of the anatomy of *Watsonius* (n. g.), *Watsoni* of man, and of 19 allied species of mammalian trematode worms of the superfamily *Paramphistomoidea*. By Ch. Wardell Stiles and Joseph Goldberger.

No. 61.—Quantative pharmacological studies: Relative physiological activity of some commercial solutions of epinephrin. By W. H. Schultz.

No. 62.—The taxonomic value of the microscopic structure of the stigmal plates in the tick genus *Dermacentor*. By Ch. Wardell Stiles.

† No. 63.—Digest of comments on the pharmacopœia of the United States of America (eighth decennial revision) and the national formulary (third edition) for the calendar year ending December 31, 1907. By Murray Galt Motter and Martin I. Wilbert.

No. 64.—Studies upon anaphylaxis, with special reference to the antibodies concerned. By John F. Anderson and W. H. Frost.

No. 65.—Facts and problems of rabies. By A. M. Stimson.

No. 66.—I. The influence of age and temperature on the potency of diphtheria antitoxin. By John F. Anderson. II. An organism (*Pseudomonas proteica*) isolated from water, agglutinated by the serum of typhoid-fever patients. By W. H. Frost. III. Some considerations on colorimetry, and a new colorimeter. By Norman Roberts. IV. A gas generator, in four forms, for laboratory and technical use. By Norman Roberts.

† No. 67.—The solubilities of the pharmacopœial organic acids and their salts. By Atherton Seldell.

No. 68.—The bleaching of flour and the effect of nitrites on certain medicinal substances. By Worth Hale.

No. 69.—The effects of restricted diet and of various diets upon the resistance of animals to certain poisons. By Reid Hunt.

No. 70.—A study of melting-point determinations, with special reference to the melting-point requirements of the United States pharmacopœia. By George A. Menge.

No. 71.—1. Some known and three new endoparasitic trematodes from American fresh-water fish. By Joseph Goldberger. 2. On some new parasitic trematode worms of the genus *Telorchia*. By Joseph Goldberger. 3. A new species of *Athesmia* from a monkey. By Joseph Goldberger and Charles G. Crane.

† No. 72.—I. Report on an outbreak of typhoid fever at Omaha, Nebr. (1909-1910). By L. L. Lumsden. II. The water supply of Williamson, W. Va., and its relation to an epidemic of typhoid fever. By W. H. Frost.

No. 73.—The effect of a number of derivatives of choline and analogous compounds on the blood pressure. By Reid Hunt and R. de M. Taveau.

No. 74.—Digitalis standardization and the variability of crude and of medicinal preparations. By Worth Hale.

No. 75.—Digest of comments on the pharmacopœia of the United States of America (eighth decennial revision) and the national formulary (third edition) for the calendar year ending December 31, 1908. By Murray Galt Motter and Martin I. Wilbert.

No. 76.—The physiological standardization of ergot. By Charles Wallis Edmunds and Worth Hale.

No. 77.—Sewage pollution of interstate and international waters, with special reference to the spread of typhoid fever. By Allan J. McLaughlin.

No. 78.—Report No. 4 on the origin and prevalence of typhoid fever in the District of Columbia (1909). By L. L. Lumsden and John F. Anderson. (Including articles contributed by Thomas B. McClintic and Wade H. Frost.)

No. 79.—Digest of comments on the pharmacopœia of the United States of America (eighth decennial revision) and the national formulary (third edition) for the calendar year ending December 31, 1909. By Murray Galt Motter and Martin I. Wilbert.

No. 80.—Physiological studies in anaphylaxis. Reaction of smooth muscle from various organs of different animals to proteins. (Including reaction of muscle from nonsensitized, sensitized, tolerant, and immunized guinea pigs.) By William H. Schultz.

No. 81.—Tissue proliferation in plasma medium. By John Sundwall.

No. 82.—I. Method of standardizing disinfectants with and without organic matter. By John F. Anderson and Thomas B. McClintic. II. The determination of the phenol coefficient of some commercial disinfectants. By Thomas B. McClintic.

No. 83.—I. Sewage pollution of interstate and international waters with special reference to the spread of typhoid fever. II. Lake Superior and St. Marys River. III. Lake Michigan and the Straits of Mackinac. IV. Lake Huron, St. Clair River, Lake St. Clair, and the Detroit River. V. Lake Ontario and St. Lawrence River. By Allan J. McLaughlin.

No. 84.—Digest of comments on the pharmacopœia of the United States of America (eighth decennial revision) and the national formulary (third edition) for the calendar year ending December 31, 1910. By Murray Galt Motter and Martin I. Wilbert.

No. 85.—Index catalogue of medical and veterinary zoology. Subjects: Cestoda and cestodaria. By Ch. Wardell Stiles and Albert Hassall.

No. 86.—Studies on typhus. By John F. Anderson and Joseph Goldberger.

No. 87.—Digest of comments on the pharmacopœia of the United States of America (eighth decennial revision) and on the national formulary (third edition) for the calendar year ending December 31, 1911. By Murray Galt Motter and Martin I. Wilbert.

No. 88.—Method for determining the toxicity of coal-tar disinfectants, together with a report on the relative toxicity of some commercial disinfectants. By Worth Hale.

No. 89.—Sewage pollution of interstate and international waters with special reference to the spread of typhoid fever. VI. The Missouri River from Sioux City to its mouth. By Allan J. McLaughlin.

No. 90.—Epidemiologic studies of acute anterior poliomyelitis. I. Poliomyelitis in Iowa, 1910. II. Poliomyelitis in Cincinnati, Ohio, 1911. III. Poliomyelitis in Buffalo and Batavia, N. Y., 1912. By Wade H. Frost.

No. 91.—I. The cause of death from subdural injections of serum. By Worth Hale. II. Some new cholera selective media. By Joseph Goldberger.

No. 92.—Gaseous impurities in the air of railway tunnels. By Atherton Seldell and Philip W. Meserve.

No. 93.—Digest of comments on the pharmacopœia of the United States of America (eighth decennial revision) and on the national formulary (third edition) for the calendar year ending December 31, 1912. By Murray Galt Motter and Martin I. Wilbert.

No. 94.—I. Collected studies on the insect transmission of *Trypanosoma evansi*. By M. Bruin Mitzmain. II. Summary of experiments in the transmission of anthrax by biting flies. By M. Bruin Mitzmain.

No. 95.—Laboratory studies on tetanus. By Edward Francis.

No. 96.—1. Report of investigation of coastal waters in the vicinity of Gulfport and Biloxi, Miss., with special reference to the pollution of shellfish. By R. H. Creel. 2. A comparison of methods for the determination of oxygen in waters in presence of nitrite. By Elias Elvove. 3. Some new compounds of the choline type. III. Including preparation of monoacetate of *a, B* dioxy-*B*-methyl butane. By G. A. Menge. 4. The detection of white phosphorus in matches. By Earle B. Phelps. 5. The chemical composition of rubber in nursing nipples and in some rubber toys. By Earle B. Phelps and Albert F. Stevenson. 6. The analysis of thymol capsules. By Atherton Seidell. 7. Seasonal variation in the composition of the thyroid gland. By Atherton Seidell and Frederic Fenger. 8. Note on a new apparatus for use with the Winkler method for dissolved oxygen in water. By Herman L. Shoub. 9. The pharmacological action of some serum preservatives. By Carl Voegtlin.

No. 97.—1. Some further siphonaptera. 2. A further report on the identification of some siphonaptera from the Philippine Islands. 3 The taxonomic value of the copulatory organs of the females in the order of siphonaptera. By Carroll Fox.

No. 98.—Digest of comments on the pharmacopœia of the United States of America (eighth decennial revision) and on the national formulary (third edition) for the calendar year ending December 31, 1913. By Murray Galt Motter and Martin I. Wilbert.

No. 99.—The Friedmann treatment for tuberculosis. A report of the board appointed for its investigation. By John F. Anderson and Arthur M. Stimson.

No. 100.—Pituitary standardization; a comparison of the physiological activity of some commercial pituitary preparations. By George B. Roth. 2. Examination of drinking water on railroad trains. By Richard H. Creel. 3. Variation in the epinephrine content of suprarenal glands. By Atherton Seidell and Frederic Fenger.

No. 101.—I. Complement fixation in tuberculosis. By A. M. Stimson. II. Report of an investigation of diphtheria carriers. By Joseph Goldberger, C. L. Williams, and F. W. Hatchel. III. The excretion of thymol in the urine. By Atherton Seidell. IV. The sterilization of dental instruments. By H. E. Hasseltine. V. A modification of Rose's method for the estimation of pepsin. By Maurice H. Givens.

No. 102.—I. Digitalis standardization. The physiological evaluation of fat-free digitalis and commercial digitalin. By George B. Roth. II. Preliminary observations on metabolism in pellagra. By Andrew Hunter, Maurice H. Given, and Robert C. Lewis.

No. 103.—I. Chemical changes in the central nervous system as a result of restricted vegetable diet. By Mathilde L. Koch and Carl Voegtlin. II. Chemical changes in the central nervous system in pellagra. By Mathilde L. Koch and Carl Voegtlin.

No. 104.—I. Investigation of the pollution and sanitary conditions of the Potomac watershed with special reference to self-purification and the sanitary condition of shellfish in the lower Potomac River. By Hugh S. Cumming. II. Plankton studies. By W. C. Purdy. III. Hydrographic studies. By Homer P. Ritter.

No. 105.—Digest of comments on the Pharmacopœia of the United States of America and on the national formulary for the calendar year ending December 31, 1914. By Martin I. Wilbert.

No. 106.—Tissue alterations in malnutrition and pellagra. By John Sundwall.

No. 107.—Changes in the pharmacopœia and the national formulary. A digest of the changes and the requirements included in the Pharmacopœia of the United States (ninth decennial revision) and in the National Formulary (fourth issue) with references to the titles not continued from the preceding editions. By Martin I. Wilbert.

No. 108.—Experimental studies with muscicides and other fly-destroying agencies. By Earle B. Phelps and Albert F. Stevenson.

In citing these bulletins bibliographers and authors are requested to adopt the following abbreviations: Bull. No. —, Hyg. Lab., Wash., pp. —.

The service will enter into exchange of publications with medical and scientific organizations, societies, laboratories, journals, and authors. ALL APPLICATIONS FOR THESE PUBLICATIONS SHOULD BE ADDRESSED TO THE "Surgeon General, U. S. Public Health Service, Washington, D. C.," EXCEPT THOSE MARKED (*) AND (†).

The publications marked (*) are no longer available for distribution by the Surgeon General of the Public Health Service. Copies of those marked (†) may, however, be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., who sells publications at cost, and to whom requests for publications thus marked should be made.

ADDITIONAL COPIES
OF THIS PUBLICATION MAY BE PROCURED FROM
THE SUPERINTENDENT OF DOCUMENTS
GOVERNMENT PRINTING OFFICE
WASHINGTON, D. C.

AT
10 CENTS PER COPY



TREASURY DEPARTMENT
UNITED STATES PUBLIC HEALTH SERVICE

HYGIENIC LABORATORY—BULLETIN No. 109

DECEMBER, 1916

I. PITUITARY STANDARDIZATION. THE RELATIVE VALUE OF INFUNDIBULAR EXTRACTS MADE FROM DIFFERENT SPECIES OF MAMMALS AND A COMPARISON OF THEIR PHYSIOLOGICAL ACTIVITY WITH THAT OF CERTAIN COMMERCIAL PREPARATIONS.

By GEORGE B. ROTH

II. PHARMACOLOGICAL STUDIES WITH COCAINE AND NOVOCAINE. A COMPARATIVE INVESTIGATION OF THESE SUBSTANCES IN INTACT ANIMALS AND ON ISOLATED ORGANS.

By GEORGE B. ROTH



WASHINGTON
GOVERNMENT PRINTING OFFICE
1917

**ADDITIONAL COPIES
OF THIS PUBLICATION MAY BE PROCURED FROM
THE SUPERINTENDENT OF DOCUMENTS
GOVERNMENT PRINTING OFFICE
WASHINGTON, D. C.
AT
25 CENTS PER COPY**

ORGANIZATION OF HYGIENIC LABORATORY.

RUPERT BLUE, *Surgeon General,*
United States Public Health Service.

ADVISORY BOARD.

Maj. Eugene R. Whitmore, Medical Corps, United States Army; Medical Inspector E. R. Stitt, United States Navy; Dr. A. D. Melvin, Chief of United States Bureau of Animal Industry; and Surgeon George W. McCoy, United States Public Health Service, *ex officio*.

Prof. William H. Welch, Johns Hopkins University, Baltimore, Md.; Prof. Simon Flexner, Rockefeller Institute for Medical Research, New York; Prof. Victor C. Vaughan, University of Michigan, Ann Arbor, Mich.; Prof. William T. Sedgwick, Massachusetts Institute of Technology, Boston, Mass.; Prof. M. P. Ravenel, University of Missouri, Columbia, Mo.

LABORATORY CORPS.

Director.—Surg. George W. McCoy.

Assistant director.—Surg. A. M. Stimson.

Senior pharmacist.—C. O. Sterns, Ph. G.

Junior pharmacist.—Clyde Ritter, Ph. G.

Artist.—Leonard H. Wilder.

DIVISION OF PATHOLOGY AND BACTERIOLOGY.

In charge of division.—Surg. George W. McCoy.

Assistants.—Surgs. Hugh S. Cumming, Leslie L. Lumsden, Lunsford D. Fricks, Carroll Fox, A. M. Stimson; Passed Asst. Surgs. H. E. Hasseltine, James P. Leake; Asst. Surgs. M. H. Neill, N. E. Wayson, and Gleason C. Lake.

DIVISION OF ZOOLOGY.

Professor of zoology.—Ch. Wardell Stiles, Ph. D.

Assistant.—Surg. Joseph Goldberger.

Technical assistant.—Walter D. Cannon, LL. B., A. B., M. D.

DIVISION OF PHARMACOLOGY.

Professor of pharmacology.—Carl Voegtlin, Ph. D.

Technical assistants.—Atherton Seldell, Ph. D.; Murray Galt Motter, A. M., M. D.; George B. Roth, A. B., M. D.

DIVISION OF CHEMISTRY.

Professor of chemistry.—Earle B. Phelps, S. B.

Sanitary chemist.—Albert F. Stevenson, S. B.

Technical assistant.—Elias Elvove, M. S., Pharm. D.



CONTENTS.

	Page.
I. Pituitary standardization. The relative value of infundibular extracts made from different species of mammals and a comparison of their physiological activity with that of certain commercial preparations.	
By George B. Roth.....	9
Introduction.....	9
Part 1, Recent literature pertaining to pituitary body.....	10
Literature of a chemical nature.....	10
Literature of a physiological nature.....	13
Literature of a clinical nature.....	14
Part 2, Scope of present investigation.....	16
Methods employed.....	16
Blood pressure method.....	16
Isolated uterus method.....	18
Yield of posterior lobe material from various mammals.....	19
Manner of making experimental infundibular extracts.....	21
Examination of experimental infundibular extracts made from fresh material.....	21
Series 1.....	22
Series 2.....	22
Series 3.....	23
Series 4.....	23
Series 5.....	24
Series 6.....	24
Series 7.....	25
Summary of results obtained in series 1 to 7.....	26
Effect of certain procedures on activity of infundibular extracts.....	26
Effect of addition of acetic acid.....	26
Effect of drying fresh infundibular material.....	26
Extraction of active substances from infundibular material, by maceration in water acidulated with acetic acid.....	26
Commercial infundibular extracts examined.....	26
Activity of these extracts.....	27
Effect of commercial infundibular extracts on isolated intestine of rabbit.....	28
Discussion of foregoing results.....	30
Summary.....	31
Conclusions.....	31
Bibliography.....	32
II. Pharmacological studies with cocaine and novocaine. A comparative investigation of these substances in intact animals and on isolated organs.	
By George B. Roth.....	35
Introduction.....	35
Part 1, Toxicity in intact animals.....	37
Melting point of samples of cocaine and novocaine.....	38
Toxicity of cocaine and novocaine in frogs when injected into ventral lymph sac.....	38

II. Pharmacological studies with cocaine and novocaine—Continued.	Page.
Toxicity of cocaine and novocaine in white mice when given subcutaneously.....	39
Toxicity of cocaine and novocaine in white rats when given subcutaneously.....	41
Toxicity of cocaine and novocaine in guinea pigs when given subcutaneously.....	42
Toxicity of cocaine and novocaine in rabbits when given subcutaneously.....	43
Toxicity of cocaine and novocaine in unanesthetized rabbits when administered intravenously.....	43
Comparative toxicity of cocaine and novocaine in frogs, mice, rats, guinea pigs, and rabbits.....	44
Toxicity of cocaine and novocaine when fed to white mice.....	46
Part 2, Action on heart muscle.....	47
Effect of cocaine and novocaine on isolated heart of <i>Rana esculenta</i>	48
Cocaine (Straub method).....	48
Novocaine (Straub method).....	48
Effect of cocaine and novocaine on isolated heart of <i>Rana pipiens</i>	49
Cocaine (perfusion through vena cava).....	49
Novocaine (perfusion through vena cava).....	49
Part 3, Action on smooth muscle.....	50
Effect of cocaine and novocaine on isolated ureter of dog.....	51
Cocaine.....	51
Novocaine.....	51
Effect of cocaine and novocaine on isolated intestine of rabbit.....	51
Cocaine.....	51
Novocaine.....	52
Effect of cocaine and novocaine on isolated urinary bladder of cat....	52
Effect of cocaine and novocaine on isolated stomach of cat.....	52
Effect of cocaine and novocaine on isolated uterus of rabbit.....	53
Part 4, Effects of cocaine and novocaine on blood pressure and respiration.	53
Effect on blood pressure of dogs, cats, and rabbits.....	53
Effect on respiration of dogs, cats, and rabbits when given intravenously.	55
Effect on blood pressure and respiration of rabbit when given subcutaneously in large doses.....	55
Comparative effects of cocaine and novocaine on blood pressure and respiration of dogs when given subdurally.....	56
Cause of death from cocaine and novocaine poisoning.....	58
Part 5. General considerations.....	58
Toxicity of cocaine and novocaine in man.....	58
Consideration of laboratory findings and their relation to clinical reports.....	63
Factors which should be considered in use of novocaine.....	63
Summary.....	63
Conclusions.....	64
Bibliography.....	65

LIST OF ILLUSTRATIONS.

FIGURE		Page.
1.	Comparative effects of 1 to 10,000 dilutions of cocaine and novocaine on heart of <i>Rana esculenta</i> when perfused by Straub's method.....	48
2.	Comparative effects of 1 to 20,000 dilutions of cocaine and novocaine in Clarke's solution on heart of <i>Rana pipiens</i> when perfused through vena cava.....	49
3.	Comparative effect of 1 to 100,000 dilutions of cocaine and novocaine on isolated ureter of dog.....	51
4.	Effects of various concentrations of cocaine on isolated ureter of dog.....	51
5.	Effects of novocaine on isolated ureter of dog.....	51
6.	Comparative effects of 1 to 200,000 dilutions of novocaine and cocaine on isolated intestine of rabbit.....	52
7.	Effect of a 1 to 5,000 dilution of cocaine on isolated intestine of rabbit.....	52
8.	Effect of a 1 to 5,000 dilution of novocaine on isolated intestine of rabbit.....	52
9.	Effect of cocaine and novocaine on isolated urinary bladder of cat..	52
10.	Effect of novocaine and cocaine on isolated stomach (pyloric end) of cat.....	53
11.	Effect of novocaine and cocaine on isolated uterus of rabbit (non-pregnant).....	53
12.	Effect of 2 mg. of cocaine injected intravenously into rabbit weighing 2.6 kg.	53
13.	Effect of 20 mg. of cocaine injected intravenously in rabbit weighing 2.6 kg.	53
14.	Effect of injection of 10 mg. of novocaine intravenously in a rabbit weighing 2 kg. (first injection).....	53
15.	Effect of injecting 20 mg. of novocaine in a 2.3 kg. rabbit.....	53
16.	Effect of injecting 5 mg. of novocaine into femoral vein of dog weighing 16 kg.....	53
17.	Effect of intravenous injection of 25 mg. of novocaine (first injection) in a 5.45 kg. dog.....	53
18.	Effect of injecting 10 mg. of novocaine into femoral vein of dog weighing 9.5 kg.....	53
19.	Effect of injecting 40 mg. of novocaine in same dog which was used to obtain tracing in Fig. 18.....	53
20.	Effect of intravenous injection of 10 mg. of novocaine in a cat weighing 3 kg.....	53
21.	Effect of intravenous injection of 20 mg. of novocaine on left ventricle and blood pressure of same cat used for Fig. 9.	57
22.	Effect of intravenous injection of 80 mg. of novocaine in a cat weighing 5 kg.....	57
23.	Effect of intravenous injection of 5 mg. of novocaine in dog weighing 9.5 kg.....	58
24.	Effect of intravenous injection of 40 mg. of novocaine in same dog as used for Fig. 23.....	58

PITUITARY STANDARDIZATION. THE RELATIVE VALUE OF INFUNDIBULAR EXTRACTS MADE FROM DIFFERENT SPECIES OF MAMMALS AND A COMPARISON OF THEIR PHYSIOLOGICAL ACTIVITY WITH THAT OF CERTAIN COMMERCIAL PREPARATIONS.¹

By **GEORGE B. ROTH,**

Technical Assistant, Division of Pharmacology, Hygienic Laboratory, U. S. Public Health Service, Washington, D. C.

INTRODUCTION.

The search for a definite chemical principle in infundibular extracts² which will simulate the action of these extracts (made from the posterior lobe of the pituitary body) has been vigorously pursued for many years. Up to the present time chemists and physiologists are undecided as to whether the activity of such extracts is due to one or several principles. The interest of physicians in infundibular extracts is to-day largely centered upon their value in therapeutics. The investigation of the physiological activity of commercial infundibular preparations is very necessary before a proper therapeutic value can be placed upon them. It is also highly important to know whether or not the commercial preparations possess a uniform activity if advances are to be made in therapeutics.

The present methods for estimating the activity of infundibular extracts are for the most part physiological, the chemical tests which have been elaborated being qualitative in nature. Inasmuch as the amount of active substances in infundibular extracts can now be determined by physiological tests, it is a matter of concern to the manufacturer and of interest to the physiologist to have an estimate of the active substances in extracts made in various ways.

Commercial infundibular extracts have been shown by Roth (1914) to be variable in their activity, but no positive reason could be given

¹ Manuscript submitted for publication May 29, 1916.

² Pituitary extracts made from the posterior lobe of the pituitary body have properly been named infundibular extracts by certain writers and will be referred to in this bulletin as such when the extracts from the posterior lobe of the pituitary body are spoken of. The term "neurohypophysin" may appropriately be used to designate posterior lobe extracts, while "glandulohypophysin" could be applied to anterior lobe extracts.

for the wide difference in their variability. Such variability might be caused by a number of factors, among them being the method of preparation and the animal source of the raw material.

In the present investigation a study of some of the probable causes of such variability was made, together with a study of the relative activity of infundibular extracts made experimentally in the laboratory and of those obtained in the open market.

PART 1.

RECENT LITERATURE PERTAINING TO PITUITARY BODY.

Inasmuch as the recent literature pertaining to the pituitary body bears directly upon many points raised in this paper, it would appear desirable to present a brief résumé of some of the studies which are most pertinent to the subject. A partial survey of the early literature will be found in Hygienic Laboratory Bulletin No. 100. The literature to be reviewed in the present bulletin will cover the years elapsing since the appearance of the above-mentioned bulletin, except in a few instances where it is necessary again to call attention to certain work for the sake of clearness in the present paper. Excellent reviews will be found in compiled form in Biedl's *Innere Sekretion*, 1913, and in Cushing's exhaustive work entitled "The Pituitary Body and Its Disorders."

LITERATURE OF A CHEMICAL NATURE.

The physiological activity of infundibular extracts is generally thought to be due to some constituent other than those substances which have already been isolated from it, namely, calcium, phosphorus, arsenic, bromine, choline, and guanin. Unidentified substances have been described which have been called active principles, but upon investigation it was found that they simulate the activity of infundibular extracts only in part. It was at one time considered by some that the active substance was β -iminazolyethylamine, but this has been shown to be incorrect.

From the evidence thus far produced it appears that the activity of infundibular extracts is due to several constituents rather than to any one substance. The work of Schäfer and Vincent (1899) showed that the active substances were very stable, as they found that infundibular extracts could be boiled for some time without destroying their activity. They were able to separate the active fraction into two parts, which had opposite effects on the blood pressure of dogs; the pressor principle being soluble in water, while the depressor principle was insoluble in water, alcohol, or ether. The depressor principle was not identified, but it was regarded as distinctly unlike choline.

Baudouin (1913) dried the posterior lobe material in vacuo at a low temperature, defatted the dried material, and then made an acetic acid extract. After drying the acetic acid extract it was treated with hot alcohol, which on cooling precipitated a white substance which he considered to be the active principle. Baudouin was not able to extract as much of the active material from the fresh posterior lobe as from the dried gland. He found, moreover, that the precipitate which was formed upon the addition of acetic acid was practically inactive.

Heidelberg, Pittenger, and Vanderkleed (1914) prepared a metallic compound of the whole pituitary body in the following manner: A watery extract was first made, which was then deprived of practically all proteid substances. This purified extract was then treated with salts of aluminium or other suitable metals, after which it was neutralized, thus precipitating the active principles as a metallic compound. This product was soluble in water and exhibited all of the physiological properties of infundibular extracts.

Bouin and Ancel (1914) claim to have isolated the active substance by means of phosphotungstic acid. They fixed the fresh posterior lobe material in equal parts of absolute alcohol and ether for a period of about a week, then dried the material, powdered it and allowed it to macerate in water for several days. The aqueous filtrate was then neutralized with ammoniacal lead subacetate. The filtrate remaining after the neutralization with ammoniacal lead subacetate was acidulated with sulphuric acid and precipitated with phosphotungstic acid. This precipitate was washed with distilled water and then treated with freshly prepared lead hydrate. This was then boiled for several minutes repeatedly to remove the active substance from the large number of impurities. After filtration the filtrate was finally precipitated by means of silver nitrate, the precipitate collected and washed and again rendered ammoniacal with ammonia water and filtered. The filtrate was then evaporated, leaving a crystalline material, which is a combination of silver with the active infundibular material. Ancel and Bouin (1914) carried the process further and, instead of forming a silver compound, obtained the pure base by extracting the mixture of lead hydrate and active precipitate by means of methyl alcohol. This extract was then treated with ether and crystallized in the cold.

Crawford and Ostenberg (1914) sought to isolate a pure pressor compound from the pituitary body. They extracted finely minced fresh beef glands with 0.1 per cent acetic acid by expression through cheesecloth, and coagulated the proteins by heating on a water bath and evaporating the filtrate in vacuo. This left a brownish yellow, gummy mass, which caused a marked rise in blood pressure when

injected intravenously into dogs. On treatment with hot methyl alcohol all the color and activity were carried over in the alcohol. This solution could be precipitated by concentrated sulphuric acid. The precipitate was soluble in water and produced a marked rise in the blood pressure. They were unable to precipitate an active base by means of alkalies. By dialysis through heavy parchment paper much of the color of pituitary extracts could be removed, leaving in the dialyser a very active substance. If animal membranes were used in the dialysis the pressor principles were completely removed and could not be recovered. When the dialysate through the parchment paper was collected in fractions they found that the last few fractions were without activity, whereas the fluid in the dialyser was very active. It was suggested that the mother substance of the dialysable pressor principles is nondialysable, the depressor principle passing quickly into the dialysate.

Guggenheim (1914) found that in the commercial preparation "Pituglandol," in addition to proteinogenic amines such as occur in other organ extracts, there is a specific principle which has a characteristic action on the blood pressure and respiration and which, in contrast with certain other organic extracts, causes an increase in the tone of the uterus of the rat. The specific substance is inactivated by alkalies and can be absorbed to a marked degree by such substances as lead sulphide or talc. The specific substance somewhat resembled pilocarpine in its behavior toward alkalies. It is unlike β -iminazolyethylamine, both as regards its reaction toward alkalies and its effect on the uterus of the rat. He regards the active principle in Pituglandol as an ethereal combination of an alkanolamin with an acyl residue.

Aldrich (1915) prepared an aqueous extract from the desiccated, defatted posterior lobe and from it was able to separate what seemed to be histidine, or a compound of histidine which was in a more or less free state or in some combination other than with protein. No experiments were made to determine whether his compound was physiologically active nor to ascertain whether it behaved in the organism like infundibular extract made in the usual way.

Watanabe and Crawford (1916) were able to obtain color reactions from certain infundibular extracts which were similar to those given by suprarenal extracts. The physiological effects of such solutions, however, differed from those produced by suprarenal extracts. They explained this phenomenon by supposing that there existed in the solution an admixture of substances which mask the effect of the epinephrine. Their experiments, therefore, suggest the presence of epinephrine, or an epinephrine-like compound, in infundibular extracts.

LITERATURE OF A PHYSIOLOGICAL NATURE.

The early work of Oliver and Schäfer (1895) and of Howell (1898) on the physiological action of the pituitary body brought this structure into prominence as an organ worthy of further investigation by physiologists. They showed not only that extracts made from the pituitary body of mammals were physiologically active but that the activity resided mainly in the infundibular lobe. Herring (1908) confirmed these findings on birds, and further found that extracts of the pituitary body of the skate, which possesses only a rudimentary posterior lobe, were physiologically inactive.

Lewis, Miller, and Matthews (1911), working with the ox pituitary body, found that the more sharply the intermediary portion of the pituitary body was removed and extracted, the greater would be the rise in the blood pressure which resulted from the intravenous injection of such extracts; also that if a small amount of pars intermedia were used the rise in the blood pressure would be correspondingly less. Extracts of the pars intermedia were relatively more active than extracts made from the posterior lobe. They also obtained a depressor effect, followed by a pressor effect, from extracts made from the anterior lobe.

Herring (1914) was able to obtain an active extract from both the pars intermedia and the pars nervosa of the ox pituitary body, which would stimulate the isolated virgin uterus of the rat. The pars nervosa was from two to five times more active than the pars intermedia. In extracts of 0.5 per cent and under of dried material the pars intermedia had no specific effect on the blood pressure, kidney volume, or urinary secretion. On the other hand, extracts of the pars nervosa of a strength of 0.005 per cent of the dried material produced a prolonged rise in pressure when injected intravenously in two to three cubic centimeter doses, also an increase in kidney volume and of urine.

Fenger (1915) extracted the active substances from the posterior pituitary bodies of hogs and cattle by finely mincing the material and then extracting with slightly acidulated salt solution by boiling. The extract was then filtered, sterilized, and tested on the isolated uterus of the guinea pig. He found that the physiological activity, when determined in this way, was practically the same for hogs as for cattle, and that there was no distinct seasonal variation in the activity or chemical composition of the posterior lobe of the pituitary body of cattle.

Shamoff (1916) observed that certain commercial and laboratory preparations of infundibular extracts would stimulate and others inhibit the rhythmical movements of the isolated intestine of the

rabbit. An extract, made from posterior-lobe material which had been dried in vacuo, was especially capable of producing intestinal inhibition, thus stimulating the action of epinephrine. He found that the substance was not constant in the extractives prepared in the usual ways, and, moreover, that it may be inconstant in the fresh glands from which these substances are prepared. It was suggested that its presence may depend upon the method of preparation. An effort was made to determine whether, in correspondence with their action on the intestinal segment, differences might arise as regards their blood pressure and diuretic properties, but there was nothing conclusive about such responses.

Hoskins (1916), using the intact intestine of the rabbit, confirmed the findings of Shamoff (1916). Hoskins obtained intestinal depression with every preparation of "Pituitrin" which he examined. He also obtained a similar response from saline extracts of old preparations of desiccated material.

LITERATURE OF A CLINICAL NATURE.

The clinical studies made to determine the therapeutic value of pituitary extracts are quite numerous. The majority of these studies were for the purpose of ascertaining the therapeutic value of infundibular extracts when used as uterine stimulants in labor or as a hemostatic agent in preventing postpartum hemorrhage.

Special attention should, perhaps, be directed to the literature bearing upon the use of infundibular extracts during labor, since many of the results obtained were injurious. Rupture of the uterus following the use of infundibular extract is a complication which has been frequently reported. The more recent literature contains many references to such an untoward result. Mention should be made, in this connection, of the fact that infundibular extract is administered subcutaneously in these cases, thereby securing rapid absorption. It is not unlikely that the dose has been excessive in a certain number of the cases. It would appear desirable that more accurate studies should be made to ascertain the dose to be employed, especially when given in uterine inertia.

Espeut (1913) reported rupture of the uterus, in a case of delayed parturition, after the injection of two doses of "pituglandol," administered one and one-half hours apart.

Grumann (1913) administered four injections of "pituitrin" at intervals of two hours to hasten labor, with the result that in a half hour after the last injection the contractions were so excessive that they kept up, practically continuously, for about two hours. The intense contractions destroyed the tissues to such an extent that a fistula was formed between the rectum and cervix. The child was

finally delivered by other means and died on the seventh day from sepsis.

Harrison (1914) cautions against the use of more than a second dose of infundibular extract in delayed labor. He found that the effect came on in about six minutes after its administration, and lasted from 30 to 60 minutes. The second dose is advised after one hour. In certain cases considerable damage was done to the soft parts and to the child.

Quigley (1915) disagrees with those who contend that infundibular extracts are free from danger. He has found that one-half cubic centimeter of a solution of which 1 cubic centimeter represents 0.2 gram of dried substance was sufficient in every case. He has never used larger doses than 1 cubic centimeter, and never repeats the dose more than once. In his experience, the greatest danger which confronts those who employ infundibular extract in labor is rupture of the uterus. He reports a case in which the uterus ruptured after an initial dose of 4 cubic centimeters; and two other cases in which the same result followed the use of an initial dose of 1 cubic centimeter of infundibular extract.

Zueblin (1914) employed "pituitrin," in 1 cubic centimeter doses subcutaneously, in the treatment of acute dilatation of the heart and observed a beneficial effect following its administration.

Konikow (1915) considers infundibular extract as a powerful hemostatic agent in pulmonary hemorrhages, when given subcutaneously in doses representing 0.2 gram of the dried material.

Kahn and Gordon (1915), following the suggestion of Citelli, used infundibular extract, for the control of hemorrhage following nose and throat operations, with good results. They administered "pituitrin," subcutaneously in 12 to 15 minim doses, about 15 minutes before the anesthetic was given. They discovered that the coagulation time of the blood was materially reduced, and that the blood pressure effect was variable; however, in over half of the cases the blood pressure was raised.

Duffy (1915) summarizes much of the literature dealing with the use of infundibular extracts in intestinal stasis, and gives a résumé of his experience with it in post-operative intestinal stasis. He gave "pituitrin" in 1 c. c. doses, 6, 12, and 18 hours after laparotomies, with gratifying results. He concluded that infundibular extract is an important aid in post-operative ileus, and that it should be tried in all cases where purgatives are not retained by mouth. The effect on peristalsis in cases of tympanites seemed to be more marked than in cases with no intestinal distension.

Infundibular extract is also used to some extent in the treatment of shock, asthma, hay fever, and in urinary retention; also as a diuretic

and as a galactagogue. The results obtained in these conditions are less convincing than in those previously mentioned.

PART 2.

• SCOPE OF PRESENT INVESTIGATION.

The purpose of the present investigation was to ascertain the relative value of infundibular extracts made from various species of mammals, as well as to compare their physiological activity with that of certain commercial preparations. It was previously reported by the writer that commercial preparations of infundibular extracts varied greatly in activity. At that time it was suggested that a probable reason for their variability might be found in the animal source from which infundibular extracts were made, the material being obtained either from cattle, sheep, or horses. It was therefore deemed advisable to investigate, not only the yield of active constituents in the pituitary body of cattle, sheep, and horses, but in other mammals as well, in order to find out whether the present sources of the raw material are well chosen. The study was made to include cattle, sheep, horses, hogs, cats, dogs, and rabbits.

Inasmuch as it was shown elsewhere that the activity of commercial infundibular extracts, when measured by the isolated uterus method, was not strictly proportionate to the effect on the blood pressure, the activity was measured both by the isolated uterus and the blood pressure methods.

METHODS EMPLOYED.

Blood-pressure method.—In the blood-pressure method the effect of infundibular extract on the circulatory system is taken as an index of its activity when it is injected into a vein of an anesthetized dog. By comparison with a satisfactory standard, the amount of active pressor principle in infundibular extracts can be determined quantitatively. The actual method of procedure is essentially that used in the standardization of epinephrine and allied preparations. In brief, the method here employed was as follows: A sound and healthy dog was deeply anesthetized with chlorbutanol. This was dissolved in a small amount of alcohol and given by stomach, in an amount equivalent to about 0.4 gm. per kilo of animal weight, about one-half hour before the experiment. After complete anesthesia, the animal was tied securely and the skin and superficial neck tissues were dissected back from either side of the trachea, the trachea exposed and the carotid sheaths opened. The vagi on both sides were then freed from neighboring structures and cut. One carotid artery was then separated from the surrounding tissue, a cannula being inserted into it and connected to a mercury manometer for recording the blood-pressure effects on a smoked or smooth paper. A tracheal

cannula was then introduced and connected with a respiration apparatus, in order to supply the animal with a constant amount of air. The femoral vein was then dissected from the surrounding structures and a cannula inserted into it. The animal was kept warm by means of an electric warming pad and an operating tank filled with water, which was kept at about the body temperature. Sufficient curarine was then given by the femoral vein to prevent spontaneous respiration. The preparations to be examined were then injected into the circulation through the cannula in the femoral vein and the effect on the blood pressure noted. Comparison was made with a standard. The amount of the unknown, required to raise the blood pressure to the same degree as it was raised by the standard solution, was ascertained by repeated trials, using unlike amounts of liquid. By the use of small amounts of infundibular extract, amounts which are much below that required to produce a maximum rise in pressure, the activity of these extracts can be determined with considerable accuracy.¹ The reaction at the close of an experiment is not as trustworthy as at the beginning, as the pressor effect is usually less marked when the blood contains a large amount of infundibular extract.

In certain respects the effect of infundibular extract and of epinephrine on the blood pressure is alike, and as the blood pressure effect of epinephrine is very fleeting, as compared with the effect produced by infundibular extract, it was thought that epinephrine, which is obtainable in a pure state and consequently less subject to variation, might be used as a standard. After repeated trials, it was found that epinephrine could not be used as successfully as a preparation of infundibular extract. In general, it was found that 1 c. c. of a 1 to 200,000 dilution of epinephrine chloride was equal in activity to 2 mgs. of fresh cattle infundibular material.² To show that the reaction to epinephrine and the reaction to infundibular extract do not vary in the same way the following will be cited. A small dog, anesthetized with chlorbutanol in the usual way, was given an intravenous injection of 1 c. c. of 1:200,000 epinephrine, causing a rise in pressure of 70 mm. of mercury. After 10 minutes 2 mgs. of infundibular extract given in the same way caused a rise of 30 mm. of mercury. One hour later, after 10 mgs. of infundibular extract had been given, a dose of 1 c. c. of 1 to 200,000 epinephrine caused a rise of 46 mm. of mercury whereas a 2 mg. dose of pituitary extract caused a rise in blood pressure of 40 mm. of mercury. In

¹ By allowing rather long intervals between successive injections, greater accuracy can possibly be secured than when short intervals are allowed.

² The specimen of epinephrine chloride which was used in these experiments was made in the Hygienic Laboratory from commercial natural l-epinephrine which by repurification yielded a fine crystalline substance whose physiological activity was several times that of the original material.

this experiment there was a decreased response to epinephrine and an increased response to infundibular extract. Furthermore, in some experiments the opposite result was noted, while in other experiments there was a marked decrease to infundibular extract and no change in the reaction to epinephrine. The change in reaction was apparently due to the state of anesthesia and to the amount of infundibular extract given to the animal. As the experiments with epinephrine did not justify using it as a standard, it was necessary to use infundibular extract itself. The infundibular extract for use as a standard was made from dried cattle material which had been collected at various times from local sources. It was obtained during the months of May, 1914, March, February, and July, 1915. Within a few minutes after killing the animals the pituitary bodies were removed and brought to the laboratory where the posterior lobe was carefully dissected free and minced and dried at a temperature of 60° C. for about 12 hours. The dried posterior lobe material was then finely pulverized in an agate mortar and used for making the standard solution, which was prepared in the following manner: One gram of the pulverized posterior lobe material was placed in a 300 c. c. Erlenmeyer flask, to which were added 95 c. c. of distilled water and 5 c. c. of 1 per cent acetic acid, and boiled for 10 minutes. After boiling it was filtered and made up to 100 c. c. One c. c. would be equivalent to 10 mg. of dried, or 50 mg. of fresh, material. The filtrate was clear and was acid to litmus. It was then put into 2 c. c. glass ampoules and sterilized at 100° C., on three successive days, for a daily period of 20 minutes.

Isolated Uterus Method.—It has been shown that a simple and reliable method for comparing the activity of infundibular extracts is that on the isolated uterus of the virgin guinea pig. This method has been described in Hygienic Laboratory Bulletin No. 100, and was used in the present investigation in the following modified form. The animal was decapitated and the uterus quickly removed and placed in Locke's solution which was heated to about the body temperature. A 1 to 2 c. m. segment of one uterine horn was then removed from the vaginal end of the uterus. Silk threads were then tied into each end of the uterine segment, one of which was fastened to a stationary glass tube and the other to a straw writing lever, which was of such length that the tracing produced by it on a smoked drum was magnified about six times. Weights of from 1 to 4 grms. were added, to overcome the tonus into which the segment was thrown by the manipulation in arranging the segment for the experiment. The preparation was then submerged in a chamber of Locke's solution¹ which was maintained at a temperature of 39 degrees centigrade by an outer warming chamber, the temperature of which

¹ Tyrode's solution has been successfully used by others.

was regulated by a bimetallic thermoregulator. The segment of uterus was always kept in 100 c. c. of the Locke's solution and supplied with oxygen at a uniform rate. After preparing the uterine segment in this way, spontaneous contractions will usually begin in about 15 to 30 minutes; occasionally they exceed these limits. The weights can then be readjusted, so as to secure a well-marked sweep of the lever. Instead of making the dilutions outside of the chamber containing the Locke's solution, as was recommended in Hygienic Laboratory Bulletin No. 100, the last dilution was made in the Locke's solution which contained the segment. This was done for the sake of simplicity, as it required less Locke's solution and less time to make the dilutions by the latter method. For example, if it were desired to ascertain the effect of a 1 to 10,000 solution of a certain preparation, 1 c. c. of a 1 to 100 solution of the preparation in Locke's was added to the chamber containing the segment, thereby making the desired solution. The chamber was emptied by means of a lower outlet tube and filled at the wide upper opening.

The standard previously recommended for the isolated uterus method was an aqueous solution of β -iminazolyethylamine hydrochloride in 1 to 20,000,000 concentration. In the present work, in addition to comparing the extracts with this standard, they were also compared with the standard solution of infundibular extract employed in the blood-pressure method, so that the same standard could be used for both methods.¹ A 1 to 1,000 stock solution of β -iminazolyethylamine hydrochloride (Hoffman-La Roche Co.) was made, using distilled water as the solvent, put into glass ampoules having a capacity of about 2 c. c., and sterilized at 100 degrees C. for 20-minute periods on three successive days.

YIELD OF POSTERIOR LOBE MATERIAL FROM VARIOUS MAMMALS.

The yield of fresh posterior lobe material from the various mammals may best be given in tabulated form. The weight of the anterior lobe will also be given, so as to show the relative yield of posterior lobe material from the pituitary body. The weighings were made as soon as possible after the material was collected and before drying had occurred. The large animals were killed, either by severing the large neck vessels or by having the brain crushed, and then quickly bled, while the small laboratory animals were etherized, or killed with illuminating gas, and then bled before the pituitary body was removed. In the small animals, it was impossible to separate the pars intermedia as a distinct entity. This was true to a certain degree in cattle. The colloid which was found in the space

¹ There was one exception to this rule. In series 7, only the "standard extract" was employed.

between the anterior and the posterior lobe was also carefully removed.

TABLE 1.—Yield of anterior and posterior lobe material in cattle.

Specimen No.	Weight of lobes in grms.		Ratio of weight of anterior to posterior.
	Anterior.	Posterior.	
1	3.215	0.507	6 to 1
2	2.441	.225	11 to 1
3	2.372	.332	7 to 1
4	1.681	.376	4 to 1

TABLE 2.—Yield of anterior and posterior lobe material in sheep.

Specimen No.	Weight of lobes in grms.		Ratio of weight of anterior to posterior.
	Anterior.	Posterior.	
1	0.323	0.023	14 to 1
2	.174	.013	13 to 1
3	.339	.019	18 to 1
4	.205	.028	9.5 to 1

TABLE 3.—Yield of anterior and posterior lobe material in hogs.

Specimen No.	Weight of lobes in grms.		Ratio of weight of anterior to posterior.
	Anterior.	Posterior.	
1	0.112	0.059	2 to 1
2	.140	.061	2.3 to 1
3	.140	.068	2 to 1
4	.150	.055	2.7 to 1

TABLE 4.—Yield of anterior and posterior lobe material in cats.

Specimen No.	Weight of lobes in grms.		Ratio of weight of anterior to posterior.
	Anterior.	Posterior.	
1	0.0167	0.009	1.7 to 1
2	.0130	.0085	1.5 to 1
3	.0165	.0065	2.5 to 1
4	.0148	.005	3 to 1
5	.0195	.009	2.1 to 1
6	.0148	.011	1.3 to 1
7	.020	.010	2 to 1

TABLE 5.—Yield of anterior and posterior lobe material in rabbits.

Specimen No.	Weight of lobes in grms.		Ratio of weight of anterior to posterior.
	Anterior.	Posterior.	
1	0.0255	0.0048	5.3 to 1
2	.0244	.009	2.7 to 1
3	.0195	.0045	4.3 to 1
4	.020	.005	4 to 1
5	.019	.0048	4 to 1

TABLE 6.—*Yield of anterior and posterior lobe material in dogs.*

Specimen No.	Weight of lobes in grms.		Ratio of weight of anterior to posterior.
	Anterior.	Posterior.	
1	0.015	0.008	2 to 1
2	.041	.019	2.2 to 1

TABLE 7.—*Yield of anterior and posterior lobe material in horses.*

Specimen No.	Weight of lobes in grms.		Ratio of weight of anterior to posterior.
	Anterior.	Posterior.	
1	1.505	0.385	4 to 1

MANNER OF MAKING EXPERIMENTAL INFUNDIBULAR EXTRACTS.

The experimental infundibular extracts used in this investigation were made from the fresh material in the following manner: After weighing the posterior lobe it was placed in an agate mortar and finely minced. It was then thoroughly triturated in the mortar and to the triturated material distilled water was added in amount equivalent to about 1 c. c. for every milligram of fresh material. This mixture was then transferred to an Erlenmeyer flask to which was added the rinsings from the mortar. For every 100 mg. of fresh material 5 c. c. of one-tenth per cent acetic acid were then added and the mixture boiled for 10 minutes. It was then filtered and, after filtration, distilled water was added so that each cubic centimeter represented the water soluble constituents from 1 mg. of fresh infundibular material.

EXAMINATION OF EXPERIMENTAL INFUNDIBULAR EXTRACTS MADE FROM FRESH MATERIAL.

After thus preparing the posterior lobes, they were examined physiologically by both the blood pressure and the isolated uterus methods, using as a standard for both methods the infundibular extract which was made in the laboratory from desiccated cattle material and which will be referred to as "standard extract." Besides the "standard extract," β -iminazolyethylamine hydrochloride was also used as a standard in the isolated uterus method in practically all cases. For the sake of brevity the latter will be referred to as β -I.

The experiments will be described in series as a rule. Each series required, for each method of assay, three or more animals; when two of the experiments gave similar results, only three experiments would be made in a given series.

Although the "standard extract" was made from desiccated material, the amounts mentioned in the following tables are in terms of fresh material, one part of the dried material being considered the equivalent of five parts of the fresh material, since it was found that in drying the posterior lobes in the manner described they would lose about 80 per cent in weight.

Series 1.—In this series the infundibular extracts were made from the posterior lobe of the pituitary body of hogs, sheep, and cattle. They will be designated as extracts Hog I, Sheep I, Steer I, and Cow I. The examination of these extracts by the blood-pressure method gave the results recorded in the following table:

TABLE 8.

Infundibular extract examined.	Standard employed.	Amount of extract required to cause blood-pressure rise equivalent to "standard extract."
Hog I.....	2 mg. of "standard extract."	1.5 mg.
Sheep I.....	do.....	2 mg.
Steer I.....	do.....	Do.
Cow I.....	do.....	Do.

The blood-pressure rise resulting from the intravenous administration to dogs of 2 mg. of "standard extract" depended largely upon the degree of anesthesia and varied from 15 to 55 mm. of mercury. As a check upon these doses double the amount was given.

In the next table is tabulated the relative activity of these extracts upon the isolated uterus of the virgin guinea pig. They were compared both with β -I in 1 to 20,000,000 dilution and with the "standard extract"; the latter, in 1 to 500,000 dilution, having an effect equivalent to β -I in 1 to 20,000,000 dilution.

TABLE 9.

Infundibular extract examined.	Standards employed.		Concentration of extract required to cause a uterine response equivalent to that caused by standards (a), (b).
Hog I.....	(a) β -I in 1 to 20,000,000 dilution.	(b) "Standard extract" in 1 to 500,000 dilution.	1 to 2,000,000.
Sheep I.....	do.....	do.....	1 to 1,000,000.
Steer I.....	do.....	do.....	Do.
Cow I.....	do.....	do.....	Do.

Series 2.—The infundibular extracts used in this series were made from pituitary bodies obtained from young cattle and hogs. They will be designated as extracts Hog 2, Steer 2, and Steer 3. Examined by the blood pressure method, their activity is shown in Table 10.

TABLE 10.

Infundibular extract examined.	Standards employed.	Amount of extract required to cause blood pressure rise equivalent to standard extract.
Hog 2.....	2 mg. of "standard extract."	1 mg.
Steer 2.....	do.....	1.4 mg.
Steer 3.....	do.....	Do.

The relative activity of this series upon the isolated uterus of the virgin guinea pig is shown in Table 11.

TABLE 11.

Infundibular extract examined.	Standards employed.		Concentration of extract required to cause a uterine response equivalent to that caused by standards (a), (b).
Hog 2.....	(a) β -I in 1 to 20,000,000 dilution.	(b) "Standard extract" in 1 to 500,000 dilution.	1 to 1,000,000.
Steer 2.....	do.....	do.....	1 to 500,000.
Steer 3.....	do.....	do.....	Do.

Series 3.—This series comprised infundibular extracts made from cattle and sheep. They will be named extracts Steer 4 and Sheep 2. By the blood-pressure method they were found to possess the following relative activity:

TABLE 12.

Infundibular extract examined.	Standards employed.	Amount of extract required to cause blood pressure rise equivalent to standard extract.
Steer 4.....	2 mg. "standard extract".	2 mg.
Sheep 2.....	do.....	Do.

Their activity on the isolated uterus of the virgin guinea pig is shown in Table 13.

TABLE 13.

Infundibular extract examined.	Standards employed.		Concentration of extract required to cause a uterine response equivalent to that caused by standards (a), (b).
Steer 4.....	(a) β -I in 1 to 20,000,000 dilution.	(b) "Standard extract" in 1 to 500,000 dilution.	1 to 500,000.
Sheep 2.....	do.....	do.....	1 to 1,000,000.

Series 4.—An infundibular extract, made from the pituitary body obtained from an old horse, and one made from the pituitary body obtained from a steer, were examined in this series. The extracts are

designated horse extract and steer 5. Their comparative activity, by the blood-pressure method, is shown by table 14.

TABLE 14.

Infundibular extract examined.	Standard employed.	Amount of extract required to cause blood pressure rise equivalent to "standard extract."
Horse.....	2 mg. "standard extract".	1.3 mg.
Steer 5.....	do.....	Do.

The following table shows their activity on the isolated uterus of the virgin guinea pig:

TABLE 15.

Infundibular extract examined.	Standards employed.		Concentration of extract required to cause a uterine response equivalent to that caused by standards (a), (b).
Horse.....	(a) β -I in 1 to 20,000,000 dilution.	(b) "Standard extract" in 1 to 500,000 dilution.	1 to 1,000,000.
Steer 5.....	do.....	do.....	Do.

Series 5.—In this series infundibular extracts made from the pituitary body of a cat and of a dog were examined. They will be designated Cat 1 and Dog 1. Their activity, by the blood-pressure method, is shown in the following table:

TABLE 16.

Infundibular extract examined.	Standard employed.	Amount of extract required to cause blood pressure rise equivalent to "standard extract."
Cat 1.....	2 mg. "standard extract".	0.5 mg.
Dog 1.....	do.....	Do.

Their activity, by the isolated-uterus method, is shown in table 17.

TABLE 17.

Infundibular extract examined.	Standards employed.		Concentration of extract required to cause a uterine response equivalent to that caused by standards (a), (b).
Cat 1.....	(a) β -I in 1 to 20,000,000 dilution.	(b) "Standard extract" in 1 to 500,000 dilution.	1 to 2,000,000.
Dog 1.....	do.....	do.....	Do.

Series 6.—Infundibular extracts from rabbits and cats comprise this series. The posterior lobes from two full-grown female rabbits and from two full-grown male cats were used in making the extracts.

They will be designated Rabbit 1 and Cat 2. These extracts were examined by the blood-pressure method, using not only the dog as the test animal, but the cat and the rabbit as well. With the exception of one rabbit, the comparative results in all of the test animals used in the blood-pressure method were the same. In this rabbit the results differed in degree. Two mg. of "standard extract" were equivalent to 0.5 mg. of cat extract; whereas both these extracts in the above doses were only slightly more active than 0.5 mg. of rabbit extract. This would suggest that certain rabbits are more sensitive to extracts made from the pituitary bodies obtained from rabbits than to extracts derived from other animals. The results of the remaining experiments are given in table 18.

TABLE 18.

Infundibular extract examined.	Standard employed.	Amount of extract required to cause blood-pressure rise equivalent to "standard extract."
Rabbit 1.....	2 mg. "standard extract".	2 mg.
Cat 2.....	do.....	0.5 mg.

In the following table is tabulated their relative activity on the isolated uterus of the virgin guinea pig:

TABLE 19.

Infundibular extract examined.	Standards employed.		Concentration of extract required to cause a uterine response equivalent to that caused by standards (a), (b).
Rabbit 1.....	(a) β -I in 1 to 20,000,000 dilution.	(b) "Standard extract" in 1 to 500,000 dilution.	1 to 1,000,000.
Cat 2.....	do.....	do.....	1 to 2,000,000.

Series 7.—The pituitary bodies obtained from three male rabbits, three male cats, and two dogs were used in making the infundibular extracts examined in this series. The extracts will be designated Rabbit 2, Cat 3, and Dog 2. For the examination of the activity of these extracts on the blood pressure, the dog, the rabbit, and the cat were used as test animals. The result, by the blood-pressure method, is shown in the following table:

TABLE 20.

Infundibular extract examined.	Standard employed.	Amount of extract required to cause blood-pressure rise equivalent to "standard extract."
Rabbit 2.....	2 mg. "standard extract".	1 mg.
Cat 3.....	do.....	0.5 mg.
Dog 2.....	do.....	Do.

The next table will show their activity on the isolated uterus of the virgin guinea pig.

TABLE 21.

Infundibular extract examined.	Standard employed.	Concentration of extract required to cause a uterine response equivalent to that caused by the standard.
Rabbit 2.....	"Standard extract" in 1 to 500,000 dilution.	1 to 500,000.
Cat 3.....	do.....	1 to 2,000,000.
Dog 2.....	do.....	Do.

Summary of results obtained in series 1 to 7.—From the results obtained in series 1 to 7 it may be concluded that of the extracts examined the infundibular extracts made from pituitary bodies of cats and dogs possess the highest degree of activity, the hog extracts being somewhat less active than those made from cats or dogs; whereas sheep extract, rabbit extract, horse extract, and cattle extract are about equally active. Individual variation occurs, and is especially shown in the various cattle extracts examined, their degree of variation being in certain instances 100 per cent.

EFFECT OF CERTAIN PROCEDURES ON ACTIVITY OF INFUNDIBULAR EXTRACTS.

Effect of addition of acetic acid.—Several experiments were carried out to determine whether infundibular extracts made with acetic acid varied in activity from those made without acetic acid, and it was found that there was no difference. The addition of acetic acid to the water containing the infundibular material is necessary, however, for the proper filtration of the soluble constituents.

Effect of drying fresh infundibular material.—Drying the fresh infundibular material at from 50 to 60° C. for from 12 to 15 hours resulted in no loss of activity. Higher temperatures than these were not tried.

Extraction of active substances from infundibular material, by maceration in water acidulated with acetic acid.—The active substances in fresh infundibular material are extracted partially by maceration for 12 to 15 hours in water acidulated with acetic acid; whereas they are extracted more completely by boiling for a period of 10 minutes.

COMMERCIAL INFUNDIBULAR EXTRACTS EXAMINED.

Seven samples of commercial infundibular extracts, the product of five American manufacturing pharmacists, were examined by the

blood pressure and by the isolated uterus methods. They will be referred to as samples 1 to 7, inclusive. All of them were bought on the open market, from local sources, by the laboratory pharmacist. Samples 1 to 4, inclusive, were bought in May, 1915; samples 5 to 7, inclusive, were purchased in December, 1915. The examination of the commercial infundibular extracts was made at the following times: Samples 1 and 2 in October, 1915; samples 3 and 4 in November, 1915; samples 5, 6, and 7 in January, 1916. Sample 2 was again examined in January, 1916. They were dispensed in 1 cc. glass ampoules. With the exception of samples 3 and 6, which were sterile solutions only, all were stated to contain, as a preservative, chlorbutanol in quantities of 5 mg. per cubic centimeter. In the following table the trade name, manufacturer's name, and serial number of these extracts will be given:

TABLE 22.

Sample No.	Trade name.	Manufacturer.	Serial No.
1	Pituitary extract	Eli Lilly & Co.	24973-514522
2	Pituitrin	Parke, Davis & Co.	1900871
3	Pituitary extract	H. K. Mulford Co.	23742-231299A
4	do	The Norwich Pharmacal Co.	27149-32915
5	do	do	31549
6	Pituitary liquid	Armour & Co.	500028
7	Pituitary extract	Eli Lilly & Co.	165930-542184

No statement was made, either on the labels or in the advertising literature of samples 1, 3, and 4, as to when the preparations should not be used. The labels of the remaining samples, however, contained statements which cautioned against the use of the preparation after a certain date, the limit at which full activity was guaranteed for any one not extending beyond December, 1916.

Activity of these commercial infundibular extracts.—In Table 23 their relative activity on the blood pressure is shown.

TABLE 23.

Sample No.	Standard employed.	Amount of extract required to cause blood pressure rise equivalent to Standard extract.	Relative activity.
1	2 mg. of "Standard extract"	8 cc. of 1 to 25 dilution	1
2	do	2 cc. of 1 to 50 dilution	8
3	do	do	8
4	do	6 cc. of 1 to 50 dilution	3
5	do	2 cc. of 1 to 10 dilution	5
6	do	2 cc. of 1 to 50 dilution	8
7	do	do	8

Their activity, as determined by the isolated uterus method, is shown in the following table;

TABLE 24.

Sample No.	Standard employed.		Concentration of extract required to cause a uterine response equivalent to that caused by standards (a), (b).	Relative activity.
1	(a) β -In 1 to 20,000,000 dilution.	(b) "Standard extract" in 1 to 500,000 dilution.	1 to 2,000.....	1
2	.....do.....	.....do.....	1 to 20,000.....	10
3	.....do.....	.....do.....	1 to 20,000.....	10
4	.....do.....	.....do.....	1 to 5,000.....	2.5
5	.....do.....	.....do.....	1 to 4,000.....	2
6	.....do.....	.....do.....	1 to 20,000.....	10
7	.....do.....	.....do.....	1 to 20,000.....	10

From the above tables it is seen that, by both of the above methods, samples 2, 3, 6, and 7 are equally active physiologically, and are many times more active than the remaining samples. As has been previously stated, samples 5 and 7 were bought later than samples 1 and 4. Relatively little difference in activity was found in samples 4 and 5, which are the product of the same manufacturer, whereas sample 7 is many times more active than sample 1, both of which were made by the same manufacturer. It is probable that the initial strength of samples 4 and 5 was relatively low, while sample 1 may have undergone deterioration. A second examination of sample 2 was made at the conclusion of these experiments, to ascertain whether any deterioration had occurred in the standards. It was found that the relative activity of the standards and of sample 2 was exactly the same as was found at the first examination. It was, therefore, considered that there was no alteration in the activity of the standards during the course of this investigation.

Effect of commercial infundibular extracts on isolated intestine of rabbit.—In the standardization of sample 7, it was discovered that while 2 c. c. of a 1 to 50 dilution would cause the same rise in the blood pressure as 2 mg. of the standard extract, double the amounts would not yield the same relative results; that is, 4 mg. of the standard extract was more active than 4 c. c. of a 1 to 50 dilution of sample 7. It appeared, therefore, that the substance which is normally present in infundibular extracts and which depresses the circulation was not perceptible in small doses, while in large doses it produced significant effects. That this phenomenon was not due to the preservative chlorbutanol, is attested to by the fact that it was the only one of the five preparations containing this preservative which behaved in this manner. Inasmuch as Shamoff (1916) and Hoskins (1916) have recently shown that certain infundibular extracts contain a substance which induces depression of

intestinal motility while others induce pure stimulation, it was thought that sample 7 might possibly contain a substance which had a depressant effect on the isolated intestine. This question was accordingly investigated, using the isolated intestine of the rabbit as the test organ. The rabbits which were used for this purpose were anesthetized with urethane (1.5 to 2 grms. per kilo by the stomach), after which a 2 to 3 cm. segment of intestine was removed from the lower part of the ileum, immersed in Locke's solution at 38 degrees Centigrade, and arranged in the usual way for recording its movements. It was found that a 1 to 200 dilution of sample 7 produced a marked increase in the height of the intestinal contractions, and a decrease in the extent of relaxation. This was followed in 2 to 3 minutes by irregularities, some slowing, but no relaxation below normal, the individual contractions being almost the height of the normal contractions. If the dilution of sample 7 were increased to 1 in 40, the intestinal movements were at once inhibited and relaxation, to a degree slightly below normal, occurred. Inasmuch as sample 7 contained chlorbutanol, a similar amount of chlorbutanol itself was tried and marked inhibition, together with relaxation below normal, occurred—results which were very similar to those obtained when using a 1 to 40 dilution of sample 7.

These experiments suggested that the preservative was the cause of the inhibition and the relaxation which were obtained when using a 1 to 40 dilution of sample 7. The following infundibular extracts, which were free from preservative, were then tried—namely, “standard extract” in 1 to 200 dilution; infundibular extract which was made from fresh cattle material (Armour & Co.),¹ using 1 to 200 dilution; and infundibular extract which was made from cattle material that had been desiccated in vacuo at 35 to 40° C. (Armour & Co.), using 1 to 200 and 1 to 40 dilutions. Without exception, all of these extracts which contained no preservative produced an increase in the extent of the contraction and a decrease in the degree of the relaxation. Occasionally, when using infundibular extract made from fresh material, a slight lessening in the extent of contraction occurred immediately after changing to the infundibular extract. This effect was not constant and, when present, lasted for only about 10 to 30 seconds. At no time was relaxation below normal noted when preparations free from preservatives were used. Although these experiments do not answer the question for which they were intended, they do show that the preservative, chlorbutanol, is a disturbing factor in the examination of infundibular extracts by an intestinal method, especially when concentrated solutions are used. In this connection it should be stated that the name “Pituitrin” has

¹ These infundibular extracts were kindly furnished me by Mr. Frederic Fenger of Armour & Co.

sometimes inappropriately been given by certain writers to infundibular extracts other than this particular commercial preparation. Since "Pituitrin" contains chlorbutanol as a preservative, it is not strictly comparable to infundibular extract. No doubt some of the conflicting statements in regard to the pharmacological action of infundibular extracts can be explained in this way.

DISCUSSION OF FOREGOING RESULTS.

The difference in the ratio between the relative activity of the various experimental infundibular extracts, by the isolated uterus and by the blood pressure methods, emphasizes the fact that both methods should be employed to determine the physiological activity of preparations of this type, as it has been particularly shown in series 3 that by one method certain preparations may be equal in activity and by the other method one was double the activity of the other. If the blood pressure method is also to be employed, a very important question to be considered in that connection is the standard to be adopted. If the response to epinephrine were similar at all times to that caused by infundibular extracts, it would be a more satisfactory standard than a preparation of infundibular extract; since the circulatory effect of epinephrine is quite similar to that caused by infundibular extract and, in addition, the epinephrine response is a very fleeting one. On the other hand, if a preparation of infundibular extract were to be used, it should be employed in relatively small doses only, so that the animal will not quickly become saturated with the extract, thus avoiding the production of the marked depressor effect on the circulation which practically always occurs after several large doses are given. It would seem that a working standard, which would be applicable to both methods, could be had in desiccated cattle infundibular material, since it is considered to be a comparatively stable substance. The employment of standards of unequal activity by the various supply houses could easily be eliminated by having a central laboratory distribute the desiccated cattle infundibular material for use as a standard. If the standardization of infundibular extracts is to be limited to a determination of but one of its physiological effects, we believe that the effect on the uterus should be taken as an index of its activity, on account of the fact that these extracts are mainly used as oxytoxics, and that the histidine derivative β -iminazolyethylamine hydrochloride should be used as the standard.

From a practical standpoint the selection of cattle infundibular material as the source of infundibular extracts has been well made. However, if horse and hog infundibular material is more readily secured in some localities than is cattle material, these sources should be taken advantage of in such instances for commercial reasons.

As is seen from the tables above, infundibular extracts made from the pituitary bodies of cats, dogs, or hogs are more active than similar extracts made from the pituitary bodies of cattle, sheep, horses, and rabbits. This would suggest that the character of the food consumed by animals influences the activity of the infundibular lobe of the pituitary body, and that extracts made from infundibular material obtained from carnivorous and omnivorous animals are more active than those from herbivorous animals.

The observations of Herring (1914), in which he found that extracts made from the pars nervosa of cattle were from two to five times as active on the uterus as extracts from the pars intermedia, and that the pars intermedia had no specific effect on the blood pressure, whereas the pars nervosa was mainly responsible for the pressor effect, should be considered in discussing the probable causes of species variation. The individual variation which was found in the same species, and which is particularly well illustrated by the variation in the cattle extracts examined, may be due, in a measure, to a possibly incomplete separation of the pars intermedia from the pars nervosa.

SUMMARY.

The determination of the activity of infundibular extracts made from the pituitary body obtained from various species of mammals—namely, cattle, sheep, horses, hogs, rabbits, cats, and dogs—was made by both the blood pressure and the isolated uterus methods, and it was found that the infundibular extracts made from cats or dogs were more active than similar extracts made from the other species of mammals. An individual variation was shown in extracts made from the same species of mammals. Commercial infundibular extracts examined in the same way showed a variation of 800 per cent by the blood pressure method and of 1,000 per cent by the isolated uterus method. A commercial preparation of infundibular extract which contained chlorbutanol as a preservative was shown to depress the motility of the isolated intestine of the rabbit when used in concentrated solution.

CONCLUSIONS.

1. The activity of infundibular extracts on the isolated uterus of the virgin guinea pig should not be taken as an index of their activity on the blood pressure.

2. Infundibular extracts made from the pituitary bodies obtained from cattle, horses, hogs, cats, dogs, and rabbits differ quantitatively in their activity.

3. The infundibular lobe of the pituitary body of cats, dogs, and hogs contains a greater amount of active materials than from cattle, sheep, horses, or rabbits.

4. Commercial infundibular extracts vary widely in their physiological activity.

5. The motor depression of the isolated intestine which is caused by certain commercial infundibular extracts is due in certain instances to the depressing effect of the preservative chlorbutanol.

BIBLIOGRAPHY.

ALDRICH, T. B.

1915. On the presence of histidine-like substances in the pituitary gland (posterior lobe). *J. A. Chem. Soc.*, vol. 37, p. 203.

ANCEL, P., and BOUIN, P.

1914. Sur une deuxième methode d'extraction du principe actif du lobe posterieur hypophysaire. *Compt. Rend. Soc. de Biol.*, vol. 76, p. 110.

BAUDOUIN, A.

1913. Sur le recherche du principe actif de l'hypophyse. *Compt. Rend. Soc. de Biol.*, vol. 74, p. 1138.

BOUIN, P., and ANCEL, P.

1914. Sur un procédé d'isolement de la substance active du lobe posterieur hypophysaire. *Compt. Rend. Soc. de Biol.*, vol. 76, p. 62.

CRAWFORD, ALBERT C., and OSTENBERG, ZENO.

1914. Contribution to the chemistry of the pituitary pressor compounds. *Am. J. Pharm.*, vol. 86, p. 291.

DUFFY, RALPH.

1915. Pituitary extract in post-operative stasis. *New York Med. J.*, vol. 101, p. 72.

ESPEUT, GERMANUS.

1913. Uterusruptur nach Pituglandol. *München. Med. Wchnschr.*, vol. 60, p. 1774.

FENGER, FREDERICK.

1915. On the composition and physiological activity of the pituitary body. *J. Biol. Chem.*, vol. 21, p. 283.

GRUMANN, —.

1913. Zur Kasuistik der Pitultrinwirkung. *München. Med. Wchnschr.*, vol. 60, p. 1436.

GUGGENHEIM, M.

1914. Beitrag zur Kenntnis des wirksamen princips der hypophyse., *Biochem. Ztschr.*, vol. 65, p. 189.

HARRISON, VIRGINIUS.

1914. Use and abuse of Pituitary Extract in labor. *J. Am. M. Ass.*, vol. 63, p. 1977.

HEIDELBERG, FRITZ, PITTENGER, PAUL S., and VANDERKLEED, CHARLES E.

1914. A pharmacodynamic study of the pituitary gland with tests of a new product. *J. Am. Pharm. Ass.*, vol. 3, p. 808.

HERRING, P. T.

1908. A contribution to the comparative physiology of the pituitary body. *Quart. J. Exper. Physiol.*, vol. 1, p. 261.

1914. The physiological Activity of the Pars Intermedia and Pars Nervosa of the Ox Pituitary quantitatively compared. *Quart. J. Exper. Physiol.*, vol. 8, p. 267.

HOSKINS, R. G.

1916. Action of Pituitary Extract. *J. Am. M. Ass.*, vol. 66, p. 738.

HOWELL, W. H.

1898. The Physiological Effects of the Hypophysis cerebri and Infundibular Body. *J. Exper. M., N. Y.*, vol. 3, p. 245.

KAHN, HARRY, and GORDON, L. E.

1915. The Use of Pituitary Extract as a Coagulant in the Surgery of the Nose and Throat. *J. Am. M. Ass.*, vol. 64, p. 301.

KONIKOW, M. J.

1915. Pituitary Extract as Hemostatic in Hemorrhages of the Lungs. *Boston M. & S. J.*, vol. 173, p. 504.

LOUIS, DEAN, MILLER, JOSEPH L., and MATTHEWS, S. A.

1911. The Effects on Blood Pressure of intravenous injections of extracts of the various anatomical components of the hypophysis. *Arch. Int. Med.*, vol. 7, p. 785.

OLIVER, G., and SCHÄFER, E. A.

1895. On the physiological action of extracts of the pituitary body. *J. Physiol.*, vol. 18, p. 277.

QUIGLEY, J. K.

1915. Pituitary extract in obstetrics. *J. Am. M. Ass.*, vol. 64, p. 1222.

ROTH, GEORGE B.

1914. Pituitary standardization. A comparison of the physiological activity of some commercial preparations. *Hyg. Lab. Bull. No. 100*, Washington, Govt. Print. Off.

SCHÄFER, E. A., and VINCENT, S.

1899. The physiological effects of extracts of the pituitary body. *J. Physiol.*, vol. 25, p. 87.

SHAMOFF, V. N.

1916. Concerning the action of various pituitary extracts upon the isolated intestinal loop. *Am. J. Physiol.*, vol. 39, p. 268.

WATANABE, WALTER K., and CRAWFORD, ALBERT C.

1916. Does the pituitary gland contain epinephrine or a compound similar to it? *J. Pharmacol. & Exper. Therap.*, vol. 8, p. 75.

ZUEBLIN, ERNEST.

1914. The action of Pituitrin upon acute heart failure and incompensate heart lesions. *Boston M. & S. J.*, vol. 171, p. 962.

66843°—17—3

• ۱۱

• ۱۲

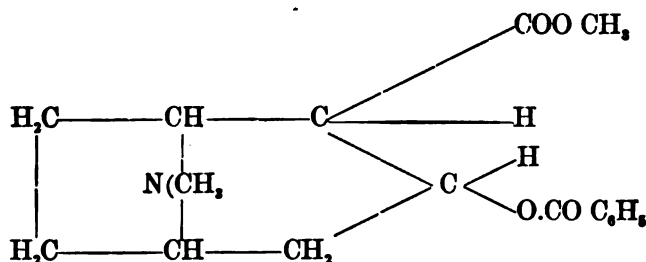
PHARMACOLOGICAL STUDIES WITH COCAINE AND NOVOCAINE. A COMPARATIVE INVESTIGATION OF THESE SUBSTANCES IN INTACT ANIMALS AND ON ISOLATED ORGANS.¹

By GEORGE B. ROTH,

Technical Assistant, Division of Pharmacology, Hygienic Laboratory, U. S. Public Health Service, Washington, D. C.

INTRODUCTION.

Soon after the discovery of cocaine and the announcement that it possessed anesthetic properties, intensive studies were made to determine the relation between its chemical constitution and the production of anesthesia. It was early recognized that cocaine was a dangerous therapeutic agent, and in the investigations that were conducted with the view of ascertaining the relation between its chemical nature and its anesthetic qualities, other compounds were discovered which produced anesthesia and were less toxic, but in many cases were too irritant or possessed some other undesirable properties which prohibited their use as local anesthetic agents. Two distinct conceptions were brought out by the early investigators with cocaine to explain the anesthesia which it and its derivatives produce. Cocaine may be resolved into the base ecgonine, methyl alcohol, and benzoic acid. It is represented by the following formula (Meyer and Gottlieb, 1914):



Cocaine (Benzoyl-methyl-ecgonine).

Stockman, 1886, investigated benzoyl-ecgonine physiologically, and found that it did not paralyze nerve endings in a manner similar to cocaine. He expressed the opinion that the relationship between

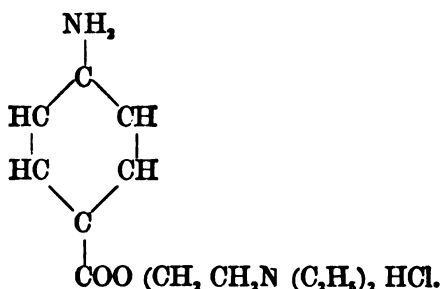
¹ Manuscript submitted for publication July 29, 1916.

the action of cocaine and benzoyl-ecgonine was altered by the substitution of the methyl-group.

Filehne, 1887, found that methyl-ecgonine was incapable of producing anaesthesia when applied locally, and considered that the benzoyl radical was the essential factor in imparting such anesthetic properties to cocaine.

Poulsson, 1890, regarded esterification with certain aliphatic radicals, such as a methyl, ethyl, or propyl radical, as the most important procedure in producing compounds of the local anesthetic type.

Since the investigations of Stockman, 1886, Filehne, 1887, and Poulsson, 1890, many derivatives of benzoic acid have been discovered which have the properties of a local anesthetic, among them being a compound, the hydrochloride of which has been given the name of novocaine. According to Meyer and Gottlieb, 1914, it has the following structural formula:



Novocaine (*p*-amido-benzoyl-diethyl-amidoethanol hydrochloride).

Novocaine hydrochloride occurs as a white substance which is made up of small crystals soluble in one part of water and in 30 parts of alcohol. It melts at 156° C. Its aqueous solution is neutral, from which it can be precipitated by all the common alkaloidal reagents.

At the present time novocaine is perhaps one of the most widely used agents for producing local anesthesia. Its very general use is dependent largely upon the fact that it is usually considered to be a comparatively safe and efficient local anesthetic; also because it has a wider range of application since, besides being readily soluble in water, it is said to withstand heating to comparatively high temperatures.

An analysis of the statements in the textbooks on pharmacology and of the original literature has shown that there is no general agreement among the various authors or the various investigators as to the exact toxicity of novocaine. This toxicity is usually expressed in terms of cocaine toxicity. Halsey, 1914, states that novocaine is one-half as toxic as cocaine. According to Cushny, 1915,

novocaine is one-third as toxic as cocaine, while Meyer and Gottlieb, 1914, regard the ratio of toxicity between cocaine and novocaine to be as 1 is to 0.3. Biberfeld, 1905, concluded that novocaine was one-fifth to one-sixth as toxic as cocaine. Le Brocq, 1909, found cocaine to be about twice as toxic as novocaine. Piquand and Dreyfus, 1910, concluded that novocaine was one-fourth to one-sixth as toxic as cocaine. Marshall, 1911, found that the relative toxicity of cocaine and novocaine was approximately as 1 is to 0.3.

It is evident from the above statements that the question of the relative toxicity of novocaine and cocaine is unsettled. The analysis of the literature further discloses the fact that although the toxicity of novocaine is relatively low, like cocaine, it is sometimes productive of untoward results, death being attributed to it in certain instances.

In consideration of the lack of uniformity in the statements regarding the toxicity of novocaine, the fact that in some cases it has produced untoward results, and for the reason that the pharmacological studies have been limited mainly to a determination of the toxicity of novocaine in intact animals, it was thought desirable to investigate the action of novocaine in order to determine not only its toxicity in intact animals, but to ascertain its effect upon the blood pressure and respiration as well as upon the heart and certain other body tissues. Such knowledge might possibly offer some explanation for the untoward results which have been reported from the use of novocaine in man. As in previous investigations, for the purpose of comparison with a well-known substance which is similarly used, comparison was made with cocaine.

The report of the studies made of these preparations is dealt with in five parts, namely: (1) Toxicity in intact animals; (2) action on heart muscle; (3) action on smooth muscle; (4) effect on the blood pressure and respiration; (5) general considerations.

PART I.

TOXICITY IN INTACT ANIMALS.

In the following experiments the toxicity of cocaine and novocaine was determined by ascertaining the minimal dose required to produce death within 24 hours when given subcutaneously or intravenously. The minimal dose which was fatal was determined in frogs, mice, rats, guinea pigs, and rabbits.

The cocaine hydrochloride which was used for most of the toxicity experiments was made by C. A. F. Kahlbaum. It was obtained in its original package and was unopened when received. When heated to 189.1° C. it liquefied as a dark-brown substance. A small amount of cocaine hydrochloride, which was obtained from the Hoffmann-

La Roche Chemical Works, was also used. This preparation liquefied at 189° C. The third sample of cocaine hydrochloride used was a Merck & Co. preparation. It liquefied at 190.2° C.

A number of samples of novocaine were employed for determining the minimal lethal doses. They were obtained upon the open market, and were in containers labeled with the manufacturer's name. Some of the bottles had been opened, part of the contents of the bottles having been previously removed.

The melting point of each sample was taken and it was found that the various samples agreed very closely as regards the melting point. The various results are recorded in the following table.

TABLE 1.—*Melting point of samples of cocaine and novocaine.*

Serial No. of sample.	Melting point.	How received.
800.....	155-156.5° C.....	Unopened.
671.....	155-155.2° C.....	Do.
644.....	155-156.5° C.....	Opened.
613.....	154-156.5° C.....	Do.
25066 ¹	153-156° C.....	Not in original bottle.
614.....	155-156.5° C.....	Unopened.
16.....	153-157° C.....	Opened.
772.....	153-156.5° C.....	Do.
707.....	153-156.2° C.....	Do.
219.....	153-156° C.....	Unopened.

¹ Druggist's number.

Most of the experiments with novocaine were done with sample No. 800.

TABLE 2.—*Toxicity of cocaine hydrochloride in frogs (Rana pipiens) when injected into ventral lymph sac.*

Frog No.	Sex. ¹	Weight in gms.	Dose in mgr. per gm. body weight.	Result. ²	Remarks.
25.....	M	25	0.05	—	
20.....	M	25	0.1	—	
26.....	M	26	0.1	—	
4.....	M	31	0.2	—	
19.....	M	25	0.3	—	
1.....	M	26	0.5	—	
27.....	M	27	0.5	—	
18.....	M	23	0.7	+	Died after 3 days.
2.....	M	32	1.0	—	Do.
13.....	M	30	1.0	—	
23.....	F	28	1.0	+	Died within 12 hours.
14.....	M	27	1.5	?	
3.....	M	32	1.5	+	Died within 7 hours.
17.....	M	22	1.5	+	Died within 24 hours.
15.....	M	27	2.0	+	Do.
16.....	M	27	3.0	+	Do.

¹ Male—M; Female—F.

² Survived—"—"; died—"+".

M. L. D.—1 mg. per gm. of body weight or 1 gm. per kilo of body weight. However, 0.7 mg. per gm. of body weight killed in 3 days.

TABLE 3.—*Toxicity of novocaine hydrochloride in frogs (Rana pipiens) when injected into ventral lymph sac.*

Frog No.	Sex. ¹	Weight in gms.	Dose in mgs. per gm. body weight.	Result. ²	Remarks.
24.....	F	35	0.1	—	
23.....	F	31	0.2	—	
8.....	M	25	0.4	—	Died after 7 days.
29.....	F	32	0.4	—	
22.....	M	30	0.5	—	
30.....	M	32	0.7	+	Died within 12 hours.
31.....	F	33	1.0	+	Do.
5.....	M	31	1.0	+	Died in about 7 hours.
9.....	M	33	1.0	—	
32.....	M	35	1.2	+	Died within 24 hours.
10.....	M	33	1.5	+	Do.
21.....	M	28	1.5	+	Do.
6.....	F	29	2.0	+	Do.
11.....	M	32	2.0	+	Do.
7.....	M	26	3.0	+	Died after 7 hours.
12.....	F	30	3.0	+	Died within 24 hours.

¹ Male—"M"; female—"F".² Survived—"—"; died—"+".

Toxicity: M. L. D.—0.7 mg. per gm. body weight or 0.700 gm. per kilo body weight.

In frogs, if the dose of cocaine were sufficiently small, a period of excitement followed the depression. With larger doses of cocaine the excitement stage was absent. Depression usually occurred, regardless of the dosage, when novocaine was given.

TABLE 4.—*Toxicity of cocaine hydrochloride in white mice administered subcutaneously.*

Mouse No.	Sex. ¹	Weight in gms.	Dose in gms. per gm. body weight.	Dose in gms. per 20 gms. body weight.	Result. ²	Remarks.
84.....	M	22.16	0.00005	0.001	—	No effect.
85.....	F	22.30	0.00007	0.0014	—	
86.....	M	20.67	0.00009	0.0018	—	Died after 5 days.
87.....	M	27.74	0.0001	0.002	—	
88.....	M	20.75	0.0001	0.002	+	Died after 12 hours.
89.....	M	22.06	0.0001	0.002	—	No effect.
90.....	M	21.4	0.00015	0.003	+	Died within 12 hours.
91.....	M	23.35	0.00015	0.003	+	Died within 6 hours.
92.....	M	26.35	0.0002	0.004	+	Do.
93.....	M	19.76	0.0002	0.004	+	Died within 3 hours.
94.....	F	21.55	0.00025	0.005	+	Do.
95.....	F	26.86	0.00025	0.005	+	Do.
96.....	M	24.14	0.0003	0.006	+	Do.
97.....	M	20.26	0.00035	0.007	+	Do.
98.....	M	23.15	0.0004	0.008	+	Do.
99.....	F	19.25	0.0005	0.010	+	Do.

¹ Male—"M"; female—"F".² Survived—"—"; died—"+".

Toxicity: M. L. D.—0.0001; S. L. D.—0.00015 (surely lethal dose).

TABLE 5.—*Toxicity of novocaine hydrochloride in white mice administered subcutaneously.*

Mouse No.	Sex. ¹	Weight in gms.	Dose in gms. per gm. body weight.	Dose in gms. per 20 gms. body weight.	Result. ²	Remarks.
56.....	M	23.5	0.0002	0.004	—	
57.....	M	21.82	0.0003	0.006	—	
92.....	M	18.43	0.0003	0.006	—	
58.....	F	23.26	0.0004	0.008	—	
93.....	F	20.83	0.0004	0.008	—	
59.....	M	22.25	0.0005	0.010	—	
94.....	M	20.6	0.0005	0.010	—	
95.....	F	19.38	0.00055	0.011	+	Died within 1 hour.
96.....	M	19	0.0006	0.012	+	Do.
97.....	F	24.32	0.0006	0.012	+	Do.
60.....	M	22.34	0.0006	0.012	+	Died after 1½ hours.
98.....	F	25.95	0.00065	0.013	—	Pregnant animal.
61.....	M	20.12	0.0007	0.014	+	Died after 1½ hours.
99.....	M	22.25	0.0007	0.014	+	Died within 1 hour.
62.....	M	21.17	0.0008	0.016	+	Died after ½ hour.
63.....	M	21.6	0.001	0.020	+	Do.

¹ Male—"M"; female—"F".² Survived—"—"; died—"+".

Toxicity: M. L. D.=0.550 gm. per kilo. of body weight. It is of interest to note that the animal which survived a lethal dose was pregnant.

The symptoms produced in mice, from the subcutaneous administration of cocaine, were unlike those produced by novocaine. Stimulation was invariably produced by cocaine; animals which received twice the minimal lethal dose, would become very much excited in about 10 or 15 minutes, and would run about wildly. The respiration and reflex irritability were increased in about one-half hour after the injection, alternate periods of clonic convulsions and quiet would intervene. This condition would last for several hours, when death would occur, apparently from exhaustion.

The symptoms caused in white mice by the subcutaneous administration of a M. L. D. of novocaine hydrochloride were drowsiness, decrease in respiration after a short period of increased respiration, muscular weakness, difficulty in walking, and finally, inability to walk. At no time were convulsions present.

TABLE 6.—*Toxicity of cocaine in white rats when given subcutaneously.*

Rat No.	Sex. ¹	Weight in gms.	Dose in mgs. per kilo body weight.	Result. ²	Remarks.
10.....	M	265	25	—	
9.....	M	243	50	—	
8.....	F	193	75	—	
7.....	F	161	100	—	
17.....	M	285	100	—	
16.....	M	180	150	—	Died after 26 days. Lung disease.
6.....	M	176	200	+	Died after 15 hours.
20.....	F	215	200	—	
18.....	M	213	250	+	Died after 20 hours.
38.....	M	235	275	—	
19.....	F	200	300	—	Died after 25 days. Lung disease.
36.....	M	202	300	—	Died within 24 hours.
35.....	M	175	350	—	
34.....	M	150	375	+	Do.
41.....	F	195	375	+	Died within 22 hours.
43.....	M	247	375	+	Do.
25.....	F	150	400	+	Died within 64 hours.
37.....	M	145	400	+	Died within 24 hours.
33.....	M	180	400	+	Do.
26.....	F	157	500	+	Died within 14 hours.
27.....	F	187	600	+	Died within 184 hours.
28.....	F	185	700	+	Died within 17½ hours.

¹ Male—"M"; female—"F."² Survived—"—"; died—"+".

Toxicity: M. L. D.—200 mg.; S. L. D. (surely lethal dose)—375 mg.

TABLE 7.—*Toxicity of novocaine in white rats when given subcutaneously.*

Rat No.	Sex. ¹	Weight in gms.	Dose in mgs. per kilo body weight.	Result. ²	Remarks.
5.....	M	276	50	—	
4.....	M	186	75	—	Died after 26 days. Lung disease.
3.....	F	167	100	—	
2.....	M	195	200	—	
13.....	M	243	300	—	Died after 31 days. Lung disease.
14.....	F	220	400	—	Died after 18 days.
1.....	M	195	400	—	
12.....	M	205	600	—	Died after 28 days. Lung disease.
15.....	F	190	800	—	Died after 24 months. Lung disease.
11.....	M	180	1,000	—	Died after 33 days. Lung disease.
31.....	M	180	1,000	—	
28.....	M	162	1,250	—	
30.....	F	157	1,500	+	Died within 12 minutes. Dose given intraperitoneally by mistake.
32.....	M	137	1,750	—	
40.....	M	196	1,750	—	
44.....	M	157	2,000	—	Died after 43 days.
21.....	F	165	2,000	+	Died after 24 days.
42.....	M	150	2,250	—	Died after 6 days.
39.....	F	137	2,500	+	Died after 8 hours.
22.....	F	172	3,000	+	Died after 2½ hours.
23.....	F	170	4,000	+	Died after 5½ hours.
24.....	M	163	5,000	+	Do.

¹ Male—"M"; female—"F."² Survived—"—"; died—"+".

Toxicity: M. L. D.—2,000 mg. per kilo of body weight.

The symptoms produced by cocaine in white rats were not especially pronounced. There was a period of mild excitement preceding the final depression. Novocaine produced depression only.

TABLE 8.—*Toxicity of cocaine hydrochloride in guinea pigs when administered subcutaneously.*

Guinea pig No.	Sex. ¹	Weight in gms.	Dose in mgs. per kilo body weight.	Result. ²	Remarks.
13	F	220	20	—	No symptoms.
5	M	243	30	—	Few symptoms; gritting teeth for about 1 hour.
14	F	220	40	—	Clonic convulsions, walking about after 40 minutes.
15	M	225	40	—	
6	M	245	50	—	
16	F	225	55	—	
12	F	445	60	+	Dead after 20 minutes.
7	M	250	60	+	Dead after 12 minutes.
8	M	240	70	+	Dead after 20 minutes.
9	F	375	80	+	
10	F	380	90	+	
11	F	395	100	+	Dead after 18 minutes.

¹ Male—"M"; female—"F."² Survived—"—"; died—"+".

Toxicity: M. L. D.—60 mg. per kilo of body weight.

TABLE 9.—*Toxicity of novocaine hydrochloride in guinea pigs when administered subcutaneously.*

Guinea pig No.	Sex. ¹	Weight in gms.	Dose in mgs. per kilo body weight.	Result. ²	Remarks.
23	M	290	200	—	Depression. Recovery in 3 hours.
24	M	235	300	—	
26	M	235	400	—	
25	M	280	500	—	Died after 3 days. Cause.
1	M	235	500	—	
27	M	310	600	+	Died after 17 minutes.
2	M	240	600	+	Died after 23 minutes.
28	M	325	700	+	Died after 32 minutes.
3	M	290	800	—	Died on 4th day from infection.
29	M	325	800	+	Died after 20 minutes.
22	M	240	900	+	Died after 3 hours.
20	M	225	1,000	+	Died after 25 minutes.
4	M	280	1,000	—	Died on the 4th day from infection.
21	M	250	1,000	+	Died after 20 minutes.
17	F	225	1,200	+	Died after 30 minutes.
18	F	220	1,500	+	Died after 20 minutes.
19	M	220	1,700	+	Died after 7 minutes.

¹ Male—"M"; female—"F."² Survived—"—"; died—"+".

Toxicity: M. L. D.—0.000 gm. per kilo of body weight.

In guinea pigs a lethal dose of novocaine would usually cause muscular weakness, together with considerable decrease in the rate and depth of respiration, within 5 to 10 minutes after its subcutaneous injection. About 20 minutes after the injection death would occur, which was often preceded by a series of abortive clonic type convulsions. After a lethal dose of cocaine guinea pigs would become very much excited and would run about wildly. The respiration and the reflexes were increased. Tonic and clonic convulsions then followed every few seconds until death supervened.

TABLE 10.—*Toxicity of cocaine hydrochloride in rabbits when administered subcutaneously.*

Rabbit No.	Sex. ¹	Weight in kilos.	Dose in mgs. per kilo body weight.	Result. ²	Remarks.
34	M	2.6	20	—	
35	M	2.3	30	—	
36	M	2.35	40	—	
12	M	2.3	50	—	
37	M	2.3	60	—	
5	F	1.85	75	+	Died after 45 minutes.
38	F	2.2	80	+	Died within 1 hour.
6	F	1.72	100	+	
39	M	2.05	100	+	Died after 30 minutes.
7	F	1.72	150	+	Died after 5 minutes.

¹ Male—M; female—F.² Survived—"—"; died—"+".

Toxicity: M. L. D.—0.075 gm. per kilogram of body weight.

TABLE 11.—*Toxicity of novocaine hydrochloride in rabbits when administered subcutaneously.*

Rabbit No.	Sex. ¹	Weight in kilos.	Dose in mgs. per kilo body weight.	Result. ²	Remarks.
29	M	2.64	100	—	
25	M	1.53	200	—	Died after 4 days from peritonitis.
13	M	2.1	257	—	
26	M	1.58	300	—	Died after 4 days. Cause unknown.
27	M	1.46	400	—	Died after 4 days from peritonitis.
23	F	1.6	400	+	Died after 20 minutes.
30	M	2.56	400	+	
24	M	1.6	500	—	
28	M	1.57	600	+	Dead after 12 minutes.
31	M	2.5	600	—	
32	M	2.1	700	+	Died after 12 minutes.
33	M	2.0	800	+	Do.

¹ Male—M; female—F.² Survived—"—"; died—"+".

Toxicity: M. L. D.—0.400 gms. per kilo of body weight.

In every case the novocaine was given in 20 per cent solution. The symptoms of novocaine and cocaine poisoning in rabbits closely resemble those which occur in guinea pigs.

The cocaine was given in either a 5 or a 10 per cent solution.

TABLE 12.—*Toxicity of cocaine hydrochloride in unanesthetized rabbits when administered intravenously (marginal ear vein).*

Rabbit No.	Sex. ¹	Weight in kilos.	Dose in mgs. per kilo body weight.	Concentration of injection fluid.	Result. ²	Remarks.
4	M	2.1	5	Per cent.	—	Died after 21 days. Lung disease.
8	F	2.07	5	1	—	
16	M	2.2	7.7	2	+	Died after 3 minutes.
6	F	1.9	10	1	—	
15	M	2.9	10	2	—	
40	M	2.4	12	2	—	
17	M	2.4	15	2	+	Died after several minutes.
41	M	2.25	15	2	+	Do.
42	M	2.04	20	2	+	Do.
43	M	1.75	25	2	+	Do.

¹ Male—M; female—F.² Survived—"—"; died—"+".

Toxicity: M. L. D.—7.7 mgs. per kilo of body weight.

S. L. D. (surely lethal dose)—15 mgs. per kilo of body weight.

TABLE 13.—*Toxicity of novocaine hydrochloride in unanesthetized rabbits when administered intravenously (marginal ear vein).*

Rabbit No.	Sex. ¹	Weight in kilos.	Dose in mgs. per kilo body weight.	Concentration of injection fluid.	Result. ²	Remarks.
				<i>Per cent.</i>		
9	M	2.47	5	2	—	
10	F	2.0	10	2	—	
5	F	2.05	10	2	—	
11	F	2.4	15	2	—	
7	F	1.85	20	2	—	
19	M	1.7	25	5	—	
18	F	1.66	30	5	+	Died after 9 minutes.
20	M	2.55	30	5	—	Died after 11 days.
44	F	1.7	30	5	—	
45	F	1.7	35	5	—	
46	F	1.55	40	5	+	Died after few minutes.
47	M	1.55	50	5	+	Do.
48	M	1.55	60	5	+	Do.

¹ Male—M; female—F.

² Survived—"—"; died—"+".

Toxicity: M. L. D.—30 mgs. per kilo of body weight.

TABLE 14.—*Comparative toxicity of cocaine and novocaine in frogs, mice, rats, guinea pigs, and rabbits.¹*

Animal used.	Method of administration.	Cocaine, M. L. D., in gms. per kilo of body weight.	Novocaine, M. L. D., in gms. per kilo of body weight.	Ratio toxicity, cocaine to novocaine.
Frogs (<i>R. pipiens</i>).....	Subcutaneously.	1.000	0.700	1.0 to 1
Mice.....	do.....	.100	.550	5.5 to 1
Rats.....	do.....	.200	2.000	10 to 1
Guinea pigs.....	do.....	.060	.600	10 to 1
Rabbits.....	do.....	.075	.400	5.3 to 1
Do.....	Intravenously.	.0077	.030	3.9 to 1

¹ The M. L. D. being the amount per kilogram of body weight required to kill within 24 hours.

From the above table it is seen that the relative toxicity of cocaine and novocaine varies and depends upon the animal used in making the determination. For warm-blooded animals the toxicity of cocaine is from 4 to 10 times greater than novocaine; while for the cold-blooded animal, the frog, the toxicity of novocaine is slightly greater than cocaine. The frog is the least susceptible animal to cocaine, while the guinea pig is the most susceptible animal. In rabbits it requires a relatively smaller intravenous than subcutaneous dose to kill with novocaine than with cocaine. To novocaine the rabbit is the most susceptible animal, while the rat is the least susceptible.

Rabbits and guinea pigs may be considered to be the most satisfactory test animals for determining the toxicity of these substances.

If cocaine or novocaine is given to anesthetized rabbits, intravenously, in dilute solutions at about five-minute intervals they will tolerate larger amounts of the drugs than when they are given in a single dose, as was done in the unanesthetized animals.

For example, a rabbit weighing 1.8 kilos, which was anesthetized with paraldehyde (1.7 c. c. per kilo by stomach) received during the course of one and one-half hours 49 mgs. of cocaine hydrochloride, intravenously, the equivalent of 27 mgs. per kilo of body weight. The drug was injected into the femoral vein in 2 to 8 mg. doses at intervals of about five minutes, each dose being dissolved in about 2 c. c. of distilled water.

To another rabbit weighing 1.64 kilos, which was similarly anesthetized, with the exception that a small amount of ether was occasionally required, 305 mgs. of novocaine were given before death resulted. This animal, therefore, received an amount of novocaine which was equivalent to 186 mgs. per kilo of body weight. The novocaine was injected into the femoral vein. It was given during the course of one and one-half hours in 5 to 20 mg. amounts, dissolved in 2 c. c. of distilled water.

When these experiments are considered, together with the results obtained in unanesthetized rabbits, we must conclude that when given slowly and in high dilutions an amount may be tolerated which is several times greater than that which is fatal when given as a single dose in concentrated solution. The concentration of the drug in the blood at any given time is a very important factor in determining the toxicity of either cocaine or novocaine. The rate of the injection, together with the concentration employed, must therefore be taken into account.

No extensive toxicological studies were made using the cat and dog as experimental animals. In order to find out the symptoms produced by novocaine in these animals a comparatively large dose was administered subcutaneously and its effects noted.

In a dog weighing 7.9 kilos a dose of 250 mgs. per kilo given subcutaneously, also in a cat weighing 2.7 kilos a dose of 500 mgs. per kilo given in the same manner produced symptoms of marked stimulation which lasted for about an hour only. From these two experiments it is seen that novocaine is somewhat similar to cocaine in that it possesses stimulating properties in these animals.

In feeding experiments with white mice the cocaine or novocaine was incorporated in cakes made up of cracker dust and milk and fed to white mice. The cakes were made in the following manner: For convenience, 128 gms. of fresh "soda" crackers, finely ground, were thoroughly mixed with a desired amount of the drug, previously dissolved in about 10 c. c. of water and 120 c. c. of milk. After mixing, the mass was then divided into 28 equal parts and dried in an open oven at 50° to 60° C. for about 24 hours. When dried each cake would then weigh about 4 gms. and would contain one twenty-eighth of the added drug.

Feeding experiments were conducted with white mice obtained from the laboratory stock.

The mice were kept in separate jars, food being withheld for 24 hours before the special feeding was begun. Each animal received the drug in a 4-gm. cake of cracker dust and milk.

Control mice were kept in the same way, but were fed on all the plain cakes that they desired. This averaged a little less than one cake a day.

TABLE 15.—*Toxicity of cocaine hydrochloride when fed to white mice.*

Mouse No.	Sex. ¹	Weight in gms.	Amount cocaine eaten in gms.	Result. ²	Number of days lived.	Amount cocaine in cake in gms.	Remarks.
28	M	20.96	0.014	+	5½	0.006	At autopsy the liver was pale grayish yellow and friable.
29	M	20.10	.011	+	6	.006	
30	F	17.34	.0075	+	9	.006	
31	F	20.3	.0025	+	4	.010	
32	F	19.4	.00125	+	3	.010	
33	M	16.52	.00125	+	1½	.010	
34	M	20.5	.00125	+	1	.010	
35	F	18.65	.010	+	5½	.020	
36	M	19.25	.020	+	5	.020	
37	M	21.68	.020	+	5½	.020	
38	F	21.83	.0025	+	3	.020	

¹ Male = M; female = F.

² Survived = —; died = +.

Total weight of animals—216.53 gms.

Average weight of animals = 19.68 gms.

Total amount of cocaine eaten—0.09125 gm.

Average amount of cocaine eaten by each mouse—0.0083 gm.

Average number of days mice lived—4.5 days.

Average lethal dose per gm. of body weight—0.000383 gm.

M. L. D.—0.883 gm. per kilo of body weight.

Upon autopsy, in all of these animals the liver was pale yellow in color. This change was especially pronounced in animal No. 30.

The mice in this series that were fed on cakes containing 0.0025 gm. of cocaine hydrochloride lived.

TABLE 16.—*Toxicity of novocaine hydrochloride when fed to white mice.*

Mouse.	Sex. ¹	Weight in gms.	Amount of novocaine eaten in gm.	Result. ²	Number of days lived.	Amount novocaine in cake in gm.	Remarks.
44	M	20.28	0.350	—	.....	0.050	No effect; experiment discontinued after 3 days.
43	F	19.70	.350	—	.....	.050	Do.
45	M	19.60	.350	—	.....	.050	Do.
39	M	20.50	1.700	—	.....	.100	No effect; experiment discontinued after 17 days.
40	M	18.35	.600	—	.....	.100	No effect; experiment discontinued after 7 days.
72	F	22.13	.800	—	.....	.200	No effect; experiment discontinued after 6 days.
78	M	23.66	.400	+	5	.400	Liver congested very dark brown color.
79	M	23.80	.800	+	6	.400	Do.

¹ Male = M; female = F.

² Survived = —; died = +.

From the above and the preceding table it will be seen that novocaine is relatively much less toxic than cocaine when fed to mice. If

we consider 0.400 gm. as the minimum lethal dose by mouth, the relative toxicity of cocaine and novocaine in this series would be about 50 to 1.

The animals would readily eat the cakes containing 0.050 to 0.100 gm. of novocaine, whereas cakes containing larger amounts would be refused.

For control purposes five mice from the laboratory stock were fed on plain cakes and otherwise kept under the same conditions as the mice which received the cocaine and novocaine. All of them lived and gained in weight.

Other experiments were conducted, with mice from the laboratory stock, to determine whether feeding novocaine in sublethal doses for a period of weeks would confer a certain immunity to cocaine when given in the same way. The experiments were not satisfactory. It appeared, however, that the mice which received novocaine in this way reacted to cocaine to the same degree as normal mice.

The symptoms produced in mice by cocaine, when fed in an amount which would ordinarily be fatal in about two days, resemble those which are produced by cocaine in these animals when administered subcutaneously.

The following experiment shows the effect of feeding cocaine to mice:

Mouse No. 9, male; weight, 14.23 gm.:

10.00 a. m., fed a 4 gm. cracker-dust and milk cake containing 0.010 gm. cocaine. Mouse ate sparingly throughout the day. No symptoms.

Next day, 8 a. m., mouse had eaten 2.5 gm. of the cake. Animal was restless. *Some rigidity in hind legs.*

9 a. m., very drowsy; respiration irregular and slow.

10.30, dyspneic; will jump at slightest touch.

10.45, spontaneous abortive clonic convulsion.

11.00, lying on side; reflexes increased.

11.05, respiration practically stopped; gasps about eight times per minute.

11.19, tonic convulsion; remains rigid for about one minute with back humped and legs extended.

11.21, dead, body rigid.

The mice which were fed on novocaine showed few symptoms. Shortly before death they became quiet and very weak in their hind legs. Some showed muscular tremors.

PART II.

ACTION ON HEART MUSCLE.

The effect of cocaine and novocaine on heart muscle was studied on the isolated heart of the frog, using both the *Rana esculenta* and the *Rana pipiens*. Perfusion was done with the drugs dissolved in Clarke's solution.¹

¹ Clarke's solution was made up as follows: NaCl 0.7 per cent; CaCl₂ 0.012 per cent; KCl 0.014 per cent; NaHCO₃ 0.02 per cent.

When the *Rana esculenta* was used the perfusion was done through the aorta according to the method of Straub, 1901. In this method a glass cannula having a capacity of about 1 c. c. was introduced into the ventricle through the aorta. After tying in the cannula, a thin wire, which is preferably made of platinum, was introduced through the tip of the ventricle for the purpose of recording the movements of the ventricle on a kymograph.

The perfusion of the isolated heart of the *Rana pipiens* was done through the vena cava. An inflow cannula was introduced into one of the anterior venæ cavæ and an outflow cannula into the aorta. The cannulæ were then tied and the remaining vessels ligated. A record of the movements of the ventricle was obtained in the same way as in the Straub method.

The Straub method was found to be better adapted for use with the heart of the *Rana esculenta* than for the heart of the *Rana pipiens*; an especial advantage which this method possessed is its adaptability to small amounts of fluid.

EFFECT OF COCAINE AND NOVOCAINE ON ISOLATED HEART OF RANA ESCULENTA.

Cocaine (Straub method).—The effect of cocaine on the isolated heart of *Rana esculenta* depended upon the concentration employed. Weak concentrations (1 to 10,000) usually produced a marked decrease in systole, together with a slight decrease in diastole. (Fig. 1.) There was usually a varying increase in rate. In certain experiments the increase in the heart rate was only several beats per minute; whereas in other experiments the increase in rate was quite marked, being as great as 10 beats per minute. In still other experiments there was a decrease in rate. When the concentration 1 to 5,000 was employed, a decrease of several beats per minute occurred, together with a marked decrease in systole and a slight decrease in diastole. Recovery was prompt when concentrations of 1 to 10,000 and 1 to 5,000 were employed. Dilutions as concentrated as 1 to 100 would produce a very prompt decrease in systole and finally stoppage in diastole. Recovery from this dilution was generally prolonged as compared with the recovery from higher dilutions.

Novocaine (Straub method).—By the Straub method novocaine in dilutions of 1 to 10,000 to 1 to 5,000 caused, in the isolated heart of *Rana esculenta*, an increase in rate similar to that caused by cocaine. Unlike cocaine, there was little or no effect on the amplitude of the contraction when the higher dilution was used; whereas when the 1 to 5,000 dilution was employed there was a slight decrease in the extent of systole. Figure 1 shows an effect not usually obtained with 1 to 10,000 dilutions, namely, a decrease in the extent of systolic

contraction followed by a slight increase in the amplitude of systolic contraction shortly after the drug was administered.

EFFECT OF COCAINE AND NOVOCAINE ON ISOLATED HEART OF RANA PIPIENS.

Cocaine (perfusion through vena cava).—When the isolated heart of *Rana pipiens* was perfused through the vena cava with cocaine in very high dilutions, 1 to 160,000 and 1 to 100,000, there was produced either no change or a slight decrease in rate. With these dilutions there was always a decrease in the extent of systole. A more concentrated dilution, 1 to 20,000, would cause a rapid decrease in rate together with a decrease in the extent of systole, so that after $\frac{1}{2}$ to 2 minutes the heart stopped in diastole. (Fig. 2.)

The effect of cocaine on the isolated heart of *Rana pipiens* is, therefore, unlike the effect on the heart of the *Rana esculenta*, since with *Rana pipiens*, in no case was an increase in rate observed when higher dilutions were used, as was observed in the *Rana esculenta*.

An effort was made to prevent or abolish the slowing produced by weak dilutions of cocaine, by applying atropine to the heart, either before slowing had occurred or after it was present; but in no instance did it have any effect on the slowing produced by cocaine. The cause of the slowing produced by cocaine in the frog, therefore, is due to a direct effect upon the heart muscle.

The effects of cocaine on the heart of *Rana pipiens* which are described above agree with those obtained by von Anrep (1879) on the intact heart of *Rana esculenta*. Von Anrep found that, in *Rana esculenta*, doses of 0.005 to 0.0015 gm. of cocaine, applied to the exposed heart *in situ*, produced no change in the extent of contraction nor in the rate; and that doses of 0.003 gm. promptly caused a decrease in rate and in the extent of contraction, finally producing diastolic standstill. These results agree with the findings of Kuroda, 1915, on the isolated heart of *Rana temporaria*. They do not agree with the results obtained by Mosso, 1887, who noted in *Rana esculenta* not only an increase in rate but in the extent of the contraction as well.

Novocaine (perfusion through vena cava).—The effects of novocaine on the isolated heart of *Rana pipiens*, when perfused through the vena cava are very similar to the effects produced by cocaine, namely, a decrease in rate accompanied by a decrease in the extent of systole, when either dilute or concentrated solutions were used. (Fig. 2.) As with cocaine, the heart is very quickly stopped in diastole by concentrated solutions. In one instance atropine partly removed the slowing caused by a 1 to 20,000 dilution of novocaine,

but the result could not be obtained in other experiments. This would indicate, however, that, in addition to having an effect on heart muscle, it may stimulate the vagus endings in the frog's heart.

The relative toxicity on the heart as shown by perfusion of the frog's heart was about 1 to 4, i. e., it required 4 times more novocaine than cocaine to produce a similar depression.

PART III.

ACTION ON SMOOTH MUSCLE.

The effects of cocaine and novocaine on smooth muscles were compared by observing the response of isolated segments of the ureter of the dog, intestine of the rabbit, urinary bladder and stomach of the cat, and uterus of the rabbit when placed in varying dilutions of the drugs in Ringer's solution.

In studying the effects of cocaine and novocaine upon the ureter, the ureter of the dog was selected, as it was found to give spontaneous rhythmical contractions when placed in Locke's solution and was sensitive to both drugs. The ureters of the rabbit and of the cat were found to be inactive when placed in Locke's solution, both as regards spontaneous rhythmical contractions and reaction to cocaine and novocaine under the conditions of the experiment. Some of the dogs which were used were either etherized or narcotized with chlorotone before removing the ureteral segment, while others were killed either with illuminating gas or painlessly by mechanical means and quickly bled before taking the ureteral segment for the experiment. As a rule, 2 to 3 inches of either ureter were taken near the middle third and mounted in the ordinary way in Locke's solution, warmed to 38° C., the segment being weighted with from 0.5 to 0.7 gm. weights. Large dogs were selected on account of the size of the ureter. Regardless of how the animal was prepared before obtaining the segment, the rhythmical contractions which may occur after it is placed in Locke's solution and weighted as a rule do not occur before one hour. The ureteral segment should be well oxygenated with a constant supply of oxygen. The ureter of the dog usually showed rhythmical contractions, which appeared at the rate of one every two or three minutes to one to three each minute. Occasionally spontaneous rhythmical contractions did not appear until after cocaine or novocaine was used, the contractions then being at fairly regular intervals. Two kinds of contractions were noticed in some segments. Ordinarily there was a single marked contraction every two to three minutes or a single contraction each minute. At times, however, with certain segments two or three small contractions appeared between the large contractions.

EFFECT OF COCAINE AND NOVOCAINE ON ISOLATED URETER OF DOG.

Cocaine.—The effect of cocaine on the isolated ureter of the dog, when arranged in the above-described manner, is as follows:

With a dilution of 1 to 100,000 an increase in height and in the number of the spontaneous contractions occurs several minutes after immersion in the solution. (Fig. 3.) The height of the contractions may not be affected, the only effect in certain cases being a slight increase in the number of contractions. Occasionally, in addition to the increase in the height and number of contractions, there is a slight increase in tonus. With a more concentrated solution (1 to 40,000) an increase in number and height of contractions always occurs, sometimes accompanied with an increase in tonus. If the solution is still more concentrated (1 to 20,000 or 1 to 10,000), a marked increase in the number of contractions occurs, together with considerable increase in tonus, the tonus at times with the 1 to 10,000 dilution causing on certain segments incomplete tetanus. Complete tetanus is caused with 1 to 5,000 dilutions after several minutes, from which recovery occurs in 10 to 15 minutes after replacing the segment in Locke's solution. (Fig. 4.)

Novocaine.—The effect of novocaine on the ureter is qualitatively similar to that of cocaine.

The isolated ureter of the dog reacts to weak dilutions of novocaine in precisely the same degree as to cocaine, but when more concentrated dilutions are used the effects while qualitatively similar are quantitatively dissimilar. A 1 to 100,000 dilution will cause an increase in the height and number of the spontaneous rhythmical contractions (Fig. 3), and in certain segments a slight increase in tonus occurs; while for the production of tetanus a more concentrated solution of novocaine is required than of cocaine, the dilution necessary to produce this effect being 1 to 2,500. (Fig. 5.) Taking the production of this phenomenon as a criterion, cocaine is about five times as active as novocaine.

EFFECT OF COCAINE AND NOVOCAINE ON ISOLATED INTESTINE OF RABBIT.

Cocaine.—In the experiments on the isolated intestine, the intestinal preparation was secured from rabbits which had been anæsthetized with 1.5 gm. urethane per kilo by stomach. The segment was usually about 1 to 1.5 inches long, and was taken from the lower part of the small intestine. The recording of its movements was done in the usual way.

The action of cocaine on the isolated intestine of the rabbit differs essentially from that of novocaine. Dilutions varying from 1 to 250,000 to 1 to 5,000 were tried. With the 1 to 250,000 dilution there

was no change in rhythm, but usually a marked gradual increase in tonus and at all times an increase in the amplitude of the contraction. (Fig. 6.) When 1 to 20,000 dilutions were used, there was a moderate decrease in the rhythm of the spontaneous contractions and in the amplitude of the contractions, without special change in the tonus. Late in the experiment, irregularities in the contractions appeared. Increasing the concentration to 1 to 5,000 caused a prompt partial cessation of the spontaneous movements. (Fig. 7.)

In some segments the tonus was maintained for some time, although the spontaneous rhythmical contractions were irregular and infrequent. If allowed to continue longer in the solution the tonus decreased.

Novocaine.—Novocaine, in as weak a dilution as 1 to 400,000, produced a slight decrease in tonus and in the extent of the amplitude of the contraction but no change in rhythm. This was true when dilutions varying from 1 to 400,000 to 1 to 20,000 were employed. (Fig. 6.) When either 1 to 20,000 or 1 to 10,000 dilutions were used little change in rhythm was produced. Sometimes a very slight decrease in rate of the rhythmical contractions followed. In addition, there was a slight loss of tonus and considerable decrease in the extent of the rhythmical contractions. A 1 to 5,000 dilution produced an effect similar in most respects to that caused by a like dilution of cocaine; namely, a decrease in the rate and extent of the amplitude of the contraction, together with irregularities in the extent of the contraction. (Fig. 8.)

EFFECT OF COCAINE AND NOVOCAINE ON ISOLATED URINARY BLADDER OF CAT.

Before removal of the bladder the cat received 1 gm. of urethane per kilo by stomach. Median sagittal segments of the bladder were used which, when relaxed with about 1 to 1.5 gm. weights, measured about 3 inches in length. The segment was mounted and its movements were recorded in the usual way.

The effects of cocaine and novocaine on segments of the urinary bladder of the cat were practically alike. Dilutions of 1 to 5,000 and 1 to 100,000, of both cocaine and novocaine, were tried and in these dilutions the segments responded by contracting. There was very little, if any, quantitative difference in the response; the cocaine effect was a trifle greater than that of the novocaine. In certain experiments, the spontaneous movements were increased in number and height by both drugs, and in other experiments they were uninfluenced. The effects are illustrated in Fig. 9.

EFFECT OF COCAINE AND NOVOCAINE ON ISOLATED STOMACH OF CAT.

For the determination of the effect of cocaine and novocaine on the isolated stomach, a strip of stomach wall taken from the pyloric

end was used. These strips were taken from the animals in the same manner as was described in the experiments on the urinary bladder, and the effects similarly recorded. Both cocaine and novocaine, in dilutions varying from 1 in 20,000 to 1 in 2,500, were used and in all experiments the effects were qualitatively the same, namely, an increase in tone or a distinct contraction, together with an increase in the amplitude of the spontaneous movements. The cocaine action was a trifle more pronounced than was the novocaine action. (Fig. 10.)

EFFECT OF COCAINE AND NOVOCAINE ON ISOLATED UTERUS OF RABBIT.

The effects of cocaine and novocaine were ascertained in the usual way on uterine segments, taken from either nonpregnant or pregnant animals which were narcotized with urethane. (1.5 gms. per kilo).

Cocaine and novocaine caused contraction in segments taken from both nonpregnant and pregnant animals, the latter being more sensitive to both cocaine and novocaine than the former. The dilutions used were 1 to 100,000 and 1 to 10,000. (Fig. 11.)

PART IV.

EFFECTS OF COCAINE AND NOVOCAINE ON BLOOD PRESSURE AND RESPIRATION.

EFFECT ON BLOOD PRESSURE.

The blood-pressure changes resulting from cocaine and novocaine were studied in dogs, cats, and rabbits. In each species the effects in anesthetized animals were recorded graphically by obtaining a record of the blood-pressure fluctuations which occurred in the carotid artery after the intravenous administration of known amounts of the drugs. The drugs were, as a rule, slowly injected into the femoral vein but occasionally in rabbits the jugular vein was used. As anesthetics for rabbits, ether or paraldehyde (1.7 c. c. per kilogram by stomach) was employed; while for cats and dogs, either chlorbutanol (0.3-0.4 gm. per kilo by stomach) or ether was used.

The effects of cocaine and novocaine on the blood pressure of dogs, cats, and rabbits are essentially alike. When either drug is given intravenously in small doses to anesthetized animals a rise in pressure usually occurs while after large doses a fall in pressure is produced. (Figs. 12 to 20, inclusive). As an exception to the above findings, there may also be a secondary fall in pressure following the rise obtained by the use of small doses. This secondary fall is inconstant. The rise which occurs after the use of small doses of cocaine is generally higher than the rise produced by novocaine, and it is produced by smaller doses.

The dose of novocaine, required to produce a rise in pressure in the rabbit, varies from 5 to 15 mg., while in the dog 10 to 40 mg.

are required. The rise may be seen in cats after doses varying from 5 to 20 mg. In dogs and rabbits the rise is not always seen; in some rabbits 5 mg. may produce a fall. By the use of doses larger than 20 mg. a fall usually occurs in either dogs, cats, or rabbits, although in some dogs 40 mg. will produce a rise. A dose which produces a rise in pressure on first injection may, if given later in the experiment, produce a fall in pressure.

The effect of novocaine on the blood pressure of the rabbit is shown in the following abstract from an experiment:

EXPERIMENT 1.—Rabbit.

Female, weight, 1.64 kilos.; anesthetized with paraldehyde; carotid blood pressure; drug injected into femoral vein; vagi intact; light anesthesia.

Time.	Drug injected.	Blood pressure fluctuations.	Remarks.
1.52	5 mg. novocaine.....	90 to 100 mm. Hg.....	Rise of 10 mm. Hg.
2.00	10 mg. novocaine.....	90 to 70 mm. Hg.....	Fall of 20 mm. Hg.
2.25	20 mg. novocaine.....	90 to 50 mm. Hg.....	Fall of 40 mm. Hg.

There was no effect on the respiration in this experiment from 5 to 10 mg. doses, but with the 20-mg. dose respiration became shallow and slower.

In the next experiment the effect of cocaine on the blood pressure of the rabbit is shown.

EXPERIMENT 2.—Rabbit.

Male, weight 1.84 kilos, anesthetized with paraldehyde, carotid blood pressure, drug injected into the femoral vein, vagi intact, anesthesia moderately profound.

Time.	Drug injected.	Blood pressure fluctuations.	Remarks.
10.43	2 mg. cocaine.....	66 to 100 mm. Hg.....	Rise of 34 mm. Hg.
11.00	4 mg. cocaine.....	64 to 48 to 100 mm. Hg.....	Fall of 16 mm. Hg. followed by rise of 36 mm. Hg.
11.50	.....do.....	55 to 38 mm. Hg.....	Fall of 16 mm. Hg.; no secondary rise.

At 10.46 the respiration was much deeper but was slowed from 96 to 83 per minute.

In the following protocol the effect of cocaine and novocaine on the dog are shown in the same experiment.

EXPERIMENT 3.—Dog.

Male, weight 7.6 kilos, ether, carotid blood pressure, drugs in femoral vein, vagi intact.

Time.	Drug injected.	Blood pressure fluctuations in mm. of Hg.	Remarks.
10.19	40 mg. cocaine.....	140-148-122.....	Rise of 8 mm., and then fall of 18.
10.52	40 mg. novocaine.....	140-150-106.....	Rise of 10 mm., then fall of 34.
11.25	40 mg. cocaine.....	146-108.....	Fall of 38 mm.
1.37	40 mg. novocaine.....	122-94.....	Fall of 28 mm.

EFFECT ON RESPIRATION WHEN GIVEN INTRAVENOUSLY.

The effects of cocaine and novocaine on the respiration were studied in dogs, cats, and rabbits. The animals were anesthetized with ether, paraldehyde, or chlorbutanol in the manner and dosage previously described. In order to record graphically respiratory changes, two methods were employed. In the first method a metal cannula was inserted into the pleural cavity through a small opening in the chest wall and connected with a tambour, the changes being recorded on a moving surface. This method, therefore, gave a record of volume changes in the entire chest cavity. In the other method a sensitive tambour was placed upon the chest wall near the diaphragm and was then connected to a double-lever tambour, which recorded its movements on a revolving drum. In the latter method the movements were for the most part diaphragmatic and gave no accurate indication as to the volume changes in the chest cavity. This method will be referred to as the "tambour method" and the former as the "pleural cannula method." When studied by the above-described methods it was found that novocaine resembles cocaine in its effect upon the respiration of dogs and rabbits, cocaine markedly stimulating the respiration when small doses were used and depressing it when larger doses were employed; whereas novocaine as a rule had a slight stimulating effect in small doses and in larger doses depressed respiration. (Figs. 12 to 20, inclusive.)

In the cat a stimulating effect on the respiration was never noticed; however, the experiments in which small doses were used were few, and in those experiments even 5 mg. doses caused a decrease in respiration. (Fig. 20.) By the pleural cannula method in one dog a 5 mg. dose of novocaine caused an increase in the rate and depth of respiration without producing any effect on the blood pressure. (Fig. 16.) In other dogs 5-10 mg. doses of novocaine would increase the depth of respiration but leave the rate unchanged. A dose of 25 mg. of either cocaine or novocaine usually decreased both the rate and amplitude of the respiratory movements.

EFFECT OF NOVOCAINE ON BLOOD PRESSURE AND RESPIRATION OF RABBIT WHEN GIVEN SUBCUTANEOUSLY.

In order to find out the effect of novocaine on the blood pressure and respiration when a large dose is injected subcutaneously, a 2-kilo rabbit, anesthetized with paraldehyde, was given a subcutaneous injection of 0.2 gm. of novocaine dissolved in 4 c. c. of water. The blood pressure was recorded in the usual way and the respiration was

ascertained by means of the pleural cannula method. The changes are shown in the following abstract from an experiment:

Time.	Respiration per minute.	Amplitude of respiration in mm.	Heart rate per minute.	Blood pressure in mm. of Hg.
10.39	50	7	108	74
11.20	44	6	95	52

There is thus seen to occur in the rabbit a distinct depression of respiration and blood pressure and a decrease in heart rate when given in the above manner.

COMPARATIVE EFFECTS OF COCAINE AND NOVOCAINE ON BLOOD PRESSURE AND RESPIRATION OF DOGS WHEN GIVEN SUBDURALLY.

An effort was made to determine the relative toxicity of novocaine and cocaine when given intraspinally. Dogs were selected, in preference to rabbits or cats, on account of the fact that the subdural space in the dog is comparatively large and because the dura may be lifted without apparent injury to it. A comparison of the blood pressure and respiratory effects resulting from comparatively large doses of cocaine and novocaine was made in etherized dogs. The effect on the blood pressure was recorded in the usual way and the effect on the respiration was obtained by the pleural cannula method. In order to inject the drugs subdurally, the second and third lumbar vertebræ were partially removed, and the dura exposed.

EXPERIMENT 4.—Dog.

(Weight, 12 kg. Etherized.)

Time.	Drug injected.	Blood-pressure fluctuations.	Remarks.
12.25	40 mg. cocaine.....	138-76 mm. Hg.....	Fall of 62 mm. Hg.
1.41	40 mg. novocaine.....	140-82 mm. Hg.....	Fall of 58 mm. Hg.

EFFECTS ON RESPIRATION.

Time.	Drug injected.	Respiratory changes			
		Amplitude.		Number in 10 seconds.	
		Before.	During.	Before.	During.
12.25	40 mg. cocaine.....	6	4	13	9
1.41	40 mg. novocaine.....	7	9	15	3

EXPERIMENT 5.—Dog.

(Weight, 9 kg. Etherized.)

EFFECTS ON THE BLOOD PRESSURE.

Time.	Drug injected.	Blood-pressure fluctuations.	Remarks.
1. 27	40 mg. novocaine.....	132-60 mm. Hg.....	Fall of 72 mm. Hg.
3. 21	40 mg. cocaine.....	116-50 mm. Hg.....	Fall of 66 mm. Hg.

EFFECTS ON THE RESPIRATION.

Time.	Drug injected.	Respiratory changes.			
		Amplitude.		Number in 10 seconds.	
		Before.	During.	Before.	During.
1. 27	40 mg. novocaine.....	5	5	3.5	2
3. 21	40 mg. cocaine.....	12	{ 18 3 }	4.5	{ 17 2 }

From the above experiments it is seen that a fall in pressure results from the use of either cocaine or novocaine in large doses, and the extent of fall is practically the same for both substances. The respiratory effects are unlike, however, in that cocaine may stimulate respiration previous to depressing it; whereas with novocaine there is little or no primary stimulation preceding the depression. These experiments would indicate that there is little, if any, difference in the toxicity of novocaine and cocaine when given intraspinally to dogs.

No systematic study was made to determine the point of action of novocaine which would explain the reason for its effects on the circulation and respiration. In a few animals, however, the heart effects were noted simultaneously with the changes in the blood pressure. In these experiments the heart was exposed, and a record of the movements of the left ventricle was obtained by means of the Cushny myocardiograph; at the same time a record of the blood-pressure changes was obtained from the carotid artery.

In the intact heart of the cat there is a distinct increase in the systole of the left ventricle with from 5 to 20 mg. doses of novocaine (Fig. 21), which is coincident with the rise in pressure; whereas after 80 mg. doses of novocaine in the cat, there is a decrease in the contraction of the left ventricle, which is also coincident with the fall in blood pressure. (Fig. 22.) These phenomena occur regardless of whether the vagi are intact or cut.

In the dog a 5 mg. dose of novocaine caused a slight but distinct increase in the contraction of the left ventricle, but at the same time

it caused a fall in the blood pressure (fig. 23), while larger doses (0.040 gm.) caused a decrease in the systole of the left ventricle, together with a fall in the blood pressure. (Fig. 24.)

Stimulation was not noticed in the intact rabbit's heart when determined in the above way, the effect always being either a negative or a depressant one.

The heart rate was always markedly slowed after large doses of novocaine in every species of animals used.

CAUSE OF DEATH FROM COCAINE AND NOVOCAINE POISONING.

The cause of death from novocaine poisoning was investigated on dogs and rabbits. In dogs which had received novocaine either intravenously or intraspinaly the respiration stopped from about one-half to one minute before the heart. In rabbits death would always occur from respiratory failure if the novocaine was injected slowly into the marginal ear vein. In these instances the animal would live for some minutes after the injection, as, for instance, when the drug was injected intravenously and the injection period was 2 to 3 minutes long. If the novocaine was injected rapidly, the animal receiving the entire amount in from one-fourth to one-half minute, death would be cardiac, the heart stopping under these conditions 10 to 15 minutes before the respiration had ceased. Death from novocaine is usually respiratory, therefore, but under certain conditions it may be cardiac, the interval between the stoppage of the heart and respiration being very short. In both rabbits and dogs death from cocaine was always respiratory, regardless of the method of its injection.

PART V.

GENERAL CONSIDERATIONS.

TOXICITY OF COCAINE AND NOVOCAINE IN MAN.

It is impossible to determine accurately the relative susceptibility of man to cocaine and novocaine, on account of the fact that the cases of novocaine poisoning are just beginning to find their way into the literature. However, from physiological tests on man and from the available reports of the cases of poisoning an approximate idea of the relative toxicity in man may be computed. Blythe, 1906, states that according to Mannheim, 1 gm. of cocaine must be considered the fatal dose for man. Blythe further states that the smallest dose known to have been fatal for an adult is 0.08 gm. and 0.05 gm. for a child.

Witthaus and Becker, 1911, compared critically the reports of 384 cases of cocaine poisoning previous to 1909. Practically all of the

cases in their series, prior to 1894, were accidental cases which resulted from its use in surgical practice. Of the fatal cases two were children, aged $2\frac{1}{2}$ and 11 years, respectively, who received 0.032 gm. (per urethra) and 0.024 gm. (intramuscularly; deltoid), respectively. The smallest lethal dose of cocaine by mouth for adults is given as 0.648 gm., while in two cases of nonhabitueés 1 gm. and 1.1 gm. did not produce death.

Falk, 1890, tabulated 176 cases of cocaine poisoning, 10 of which were fatal. Among these cases is that reported by Abadie of an aged woman in whom 0.040 gm. of cocaine was fatal when injected into the subconjunctival tissues. In Falk's series is a fatal case following the use of 0.225 gm. of cocaine when injected subcutaneously into the breast.

Ricci, 1887, reported recovery from a dose of 1.25 gm. of cocaine, when injected subcutaneously into the leg tissues.

Mattison, 1891, states that the smallest fatal subcutaneous dose of cocaine reported in the literature is 8 drops of a 4 per cent solution (probably 0.020–0.030 gm.).

Toxic symptoms from cocaine begin to appear when very small amounts are given. Minor, 1885, collected cases in which very small doses caused toxic symptoms. In one of these cases reported by Stevens, 4 minims of a $3\frac{1}{2}$ per cent solution of cocaine (0.008 gm.) injected into the subcutaneous tissues of the orbit, caused within 10 minutes difficult breathing, convulsions, and unconsciousness.

In summarizing the cocaine cases, we find that the fatal dose varies between 0.020–0.030 gm. to more than 1.25 gm., while 0.008 gm. may produce dangerous toxic symptoms. Cushny, 1915, states that, for subcutaneous injection, the dose of cocaine should never exceed 0.020 gm.

The maximum dose of novocaine tolerated by man without producing general symptoms, like other local anesthetics, depends largely upon the method of its administration. The dosage used by clinicians is remarkably wide.

Danielsen, 1905, never noticed toxic symptoms from amounts up to 0.100 gm., when injected subcutaneously, if given in 1 to 2 per cent solution.

Schmidt, 1905, used doses as large as 0.250 gm., in 1 per cent solution subcutaneously, without observing toxic effects.

Nast-Kolb, 1908, uses as much as 50 c. c. of a 1 per cent solution (0.5 gm.) subcutaneously.

Eastman, Erdman, and Bonn, 1916, state that for some operations 1 to 1.6 gm. are employed.

Braun, 1914, states that Axhausen used as much as 2 gm. subcutaneously without producing harmful effects. Braun has used in the same way as much as 250 c. c. of a 1 per cent solution (1.25

gm.) without producing any secondary effects, except occasionally vomiting.

Kreche, 1910, by mistake, gave 2 c. c. of a 20 per cent solution (0.4 gm.) of novocaine subcutaneously in an operation for carcinoma of the larynx and observed no general effects from it whatever.

Liebl, 1906, considers 0.4 gm. as a safe dose for an adult and states that doses as high as 0.75 gm. may give rise to general symptoms when used as a local anesthetic. Liebl injected 1.15 gm. into himself subcutaneously in two doses. The first dose of 0.4 gm. was injected subcutaneously into his thigh as a 10 per cent solution and caused no toxic symptoms. About 1 hour later the second dose of 0.75 gm. was injected into the subcutaneous tissues of the forearm causing within 5 minutes a feeling of nausea and some uneasiness. About 15 minutes later there was inability to concentrate, headache, double vision, lack of accommodation and deafness, together with paraesthesia along the course of the radial nerve. Within 1 hour after the second dose these symptoms had disappeared almost entirely.

Schlesinger, 1912, injected 15 c. c. of a 2 per cent solution of novocaine (0.3 gm.) into the brachial plexus of a man with pronounced arteriosclerosis and observed slow pulse, generalized twitchings of the body and collapse. These phenomena passed off in several minutes. Since this experience he has used smaller doses.

Begg (1913) reported the case of a man who received 1 grain (0.065 gm.) of novocaine combined with about three-fourths of a minim of a 1 to 1,000 solution of epinephrine subcutaneously in the tissues of the chin. Without the slightest warning the pupils became widely dilated and fixed, unconsciousness ensued, and a cold, clammy sweat broke out upon his face. Both respiration and heart were slow, and the whole body became rigid. Recovery occurred within one hour.

Landsberger (cited by Kehr, 1910) observed severe headache, paleness, general malaise, and numbness of the fingers in a girl who had received subcutaneously a small dose of a 2 per cent solution of novocaine combined with suprarenin.

Fischer and Riethmüller (1914) observed narcotic slumber following the injection of 0.66 gm. of novocaine for the extraction of teeth. Although the novocaine was given with thymol and suprarenin, in their opinion the narcosis was due to the novocaine and the unusual susceptibility of the patient.

Giffin and Gundrum (1914) reported that general symptoms resulted from one-third grain (0.020 gm.) of novocaine combined with one two-hundredth grain of synthetic suprarenin when injected into the peridental mucous membrane. Another case of nonfatal poison-

ing was reported to them as occurring after one-sixth grain (0.010 gm.) when injected in the same way.

Kehr (1910) gave one-half of a syringe-ful of a one-half per cent solution of novocaine (probably less than 0.025 gm.) to secure anesthesia for the extraction of teeth and produced pulse changes, paleness, headache, chills, dilatation of the pupils, respiratory disturbances, convulsive movements, and unconsciousness. The patient was revived by employing artificial respiration, and after several hours recovery was complete.

Marshall (1914), in relating his personal experience with novocaine, says that he was given during an hour three injections, or a total of 0.090 gm., of novocaine, combined with adrenalin, for the removal of teeth, and after the second and third injections he experienced a slight increase in pulse rate, accompanied by deep and rapid respiration. These symptoms lasted for three or four minutes only. That night he complained of headache and chilly feet, and passed a restless night. The next day while out walking he was seized with a feeling of constriction in the region of his heart, and his breathing became labored. His pulse increased from 68 to 75. After a short rest the symptoms disappeared.

For spinal anesthesia, Page (1915) gives 2 to 2.5 c. c. of a 5 per cent solution (0.100–0.125 gm.). In the same way Holman (1916) uses 0.060–0.080 gm. in 5 per cent solution. Holman cites two non-fatal cases of novocaine poisoning. In both cases 0.080 gm. of novocaine had been given intraspinally.

Heineke and Lāwen (1905) also consider the dosage of novocaine for spinal anesthesia to be 0.1 to 0.15 gm. when given as a 5 to 10 per cent aqueous solution. They have given as much as 0.18 gm. in this way. In two cases in which 0.15 gm. was given intraspinally marked weakness of the pulse and pallor, together with nausea and vomiting, followed its administration.

Hofmann, 1906, states that 2 to 3 c. c. of a 5 per cent solution (0.1 to 0.15 gm.) of novocaine is usually employed for spinal anesthesia. He, however, is inclined to use smaller doses (0.050 to 0.070 gm.). Even with these doses he has occasionally noticed headache and vomiting as accompanying symptoms. A colleague of his observed malaise followed by a feeling of well being, from 5.5 c. c. of a 1 per cent solution, when given subcutaneously for a hernia operation.

Gabbett, 1910, administered intraspinally 3 c. c. of a solution containing 0.100 gm. of novocaine and 0.001 gm. of strychnine. Ten minutes after the injection the patient had difficulty in breathing, the body became rigid and death occurred, without convulsions.

Fullerton, 1913, considers that novocaine was the cause of death in a man, aged 68, who had a weak heart and a double aortic murmur, to whom 1 c. c. of a 15 per cent solution of novocaine (0.150 gm.)

with 0.001 gm. of strychnine was given intraspinaly. Soon after the injection the patient began to vomit, and death ensued several hours after the operation.

Braun, 1914, mentions two fatal cases reported by Claus. In one case a tampon containing 6 drops of a 10 per cent solution (0.040 gm.) of novocaine and 6 drops of adrenalin was placed in the nose for 20 minutes. After removal of the tampon the antrum was washed. Almost immediately after this procedure the patient became cyanotic and died of cardiac paralysis. In the other case, a tampon containing novocaine and suprarenin was used in the nasal tract and in addition a 10 per cent cocaine solution was applied locally to the mucous membrane of the nose. Following the local anesthesia the antrum was punctured and inflated; the patient collapsed and died the same evening. Inasmuch as Claus also reported two serious cases in which a similar operation was performed without anesthesia, one of which was fatal, Braun does not regard the cases reported by Claus as cases of novocaine poisoning.

Levy and Hatcher, 1915, reported the death of a patient who had received a small dose of novocaine combined with synthetic suprarenin.¹

Scandola, 1915, reported a case of death which resulted from the intraspinal administration of a solution made from two tablets, each said to contain 0.050 gm. of novocaine and 0.000083 gm. of suprarenin. He also states that his colleague, Merusel, has observed serious symptoms, even with small doses of novocaine, and in two instances death occurred. He considered novocaine as the cause of death in both cases.

Michelsson, 1912, collected from the literature 13 fatal cases of novocaine poisoning which resulted after its use intraspinaly. Four of these cases were reported by Fuster, who did not regard novocaine as the cause of death in any of them. The remaining 9 cases were those reported by Sonnenburg (1), Bosses (1), Mohrmann (1), Silberberg (1), Konig (1), Jolly (1), Risch (2), and Waitz (1). The dose of novocaine varied in these cases between 0.050 to 0.200 gm.

From the above references it is seen that no definite conclusion can be drawn as to the exact toxicity of novocaine in man. Under certain conditions 0.020 gm. has caused poisoning symptoms; whereas 2 gms. have been given in other cases without producing symptoms.

It would appear, however, that when given intraspinaly or for dental operations it may be especially toxic. By the intraspinal method of administration 0.100 gram has produced death.

¹ Since the above bibliography was collected a very valuable contribution to the pharmacology of novocaine by Hatcher and Eggleston has appeared. In their paper they report two additional fatal cases of novocaine poisoning; the dosage in both cases probably did not exceed 20 mg. The paper is found in *J. Pharmacol. Exper. Therap.* 1916, v. 8, p. 385.

CONSIDERATION OF LABORATORY FINDINGS AND THEIR RELATION TO CLINICAL REPORTS.

The results of the laboratory experiments with cocaine and novocaine, when compared with the results obtained in the clinical use of these substances, show that man is relatively more susceptible to cocaine and novocaine than are laboratory animals. From animal experiments it is seen that the toxicity of these substances depends partly upon the manner and method of administration. The statement also seems to hold true for man. The untoward results that have been reported in the literature from the use of novocaine in operations about the head and face might well be accounted for by the fact that absorption may be very rapid, as for example in dental operations when the injection is made in a region well supplied with blood vessels, so that administration directly into the circulation is not unlikely to occur, and when injected in this way the toxicity is greater than when given subcutaneously. Individual susceptibility is marked in both animals and man. This may account for some of the fatalities reported in the literature.

FACTORS WHICH SHOULD BE CONSIDERED IN USE OF NOVOCAINE.

In addition to idiosyncrasy, age seems to be a factor in man in the production of fatal results with novocaine. In the three cases reported by Scandola, 1915, the ages of the men were 69, 75, and 80 years, respectively. In cases having low blood pressure, or cardiac disease, novocaine should be used with caution, inasmuch as in the laboratory experiments it has been shown to have a depressing effect upon the heart muscle when large doses are given.

The administration of hyoscine, previous to the use of a local anesthetic agent, is sometimes advised. If it is given before either cocaine or novocaine, it may act as a synergistic agent in depressing the respiration. In order to prevent the absorption of novocaine from the subcutaneous tissues, epinephrine is employed. Epinephrine is a relatively unstable agent, especially in alkaline solutions. It is not unlikely, therefore, that unless the epinephrine which is used with novocaine is active, general symptoms may arise from the administration of novocaine as a local anesthetic agent.

SUMMARY.

The melting point of novocaine, as determined from the examination of 10 samples used in this investigation, varied from 153° to 157° C. The relative toxicity of cocaine and novocaine, as shown by animal experiments, varies; the variation being dependent mainly upon the animal employed as test animal. The relative toxicity of cocaine and novocaine for various animals when given subcutane-

ously is as follows: For frogs (*Rana pipiens*) the ratio is 1.0 to 1.4; mice, 5.5 to 1; rats, 10 to 1; guinea pigs, 10 to 1; and rabbits 5.3 to 1. When given intravenously to rabbits, the ratio of toxicity of cocaine to novocaine is 3.9 to 1. When given intravenously the rate of administration is a factor in modifying the toxicity. The subcutaneous administration of large sublethal doses of novocaine in the dog and cat causes marked general symptoms which rapidly subside. The ratio of the toxicity of cocaine and novocaine for mice, when fed on cakes containing these substances, is much wider than when given in any other way, cocaine being about 50 times as toxic as novocaine. Feeding mice on sublethal doses of novocaine for a period of weeks did not seem to confer immunity to cocaine when the mice were fed on cocaine in the same way.

The effects of novocaine on the isolated heart of the frog resemble the effects produced by cocaine, both substances causing a decrease in rate of the heart and a decrease in the extent of systole. The relative toxicity on the heart of the frog as determined by perfusion experiments is less for novocaine than for cocaine. On smooth muscle, the effect of novocaine differs slightly from that produced by cocaine. On the isolated ureter of the dog, the isolated urinary bladder and stomach of the cat, and the isolated uterus of the rabbit, the effect of novocaine differs from that of cocaine only in being stimulating to a less degree when similar dilutions are used. On the isolated intestine of the rabbit, cocaine stimulates in dilute solutions, and in concentrated solutions depresses intestinal motility, whereas novocaine depresses it in any effective concentration. On the blood pressure and respiration, both cocaine and novocaine increase blood pressure and respiration in small doses and depress in large doses. When given subdurally, the relative toxicity of cocaine and novocaine is practically the same, as shown by the comparative effects on the blood pressure and respiration. Death in rabbits after cocaine or novocaine poisoning is usually respiratory, but with novocaine under certain conditions, death may be cardiac.

CONCLUSIONS.

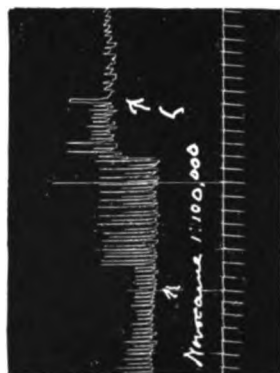
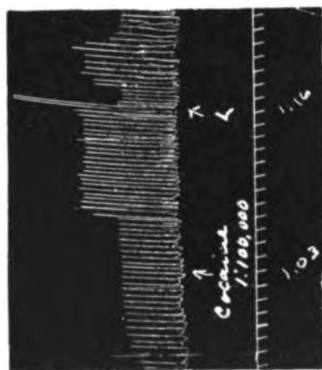
1. Novocaine is several times less toxic for laboratory animals than cocaine, the relative toxicity being dependent upon the method of administration as well as upon the animal used in making the determination.
2. Novocaine possesses many of the properties of cocaine as shown by experiments on the isolated heart, on smooth muscle, and by its effects on the circulation and respiration of anesthetized animals.
3. The depressing effect of novocaine on the blood pressure and respiration of animals makes it necessary to use caution in its ad-



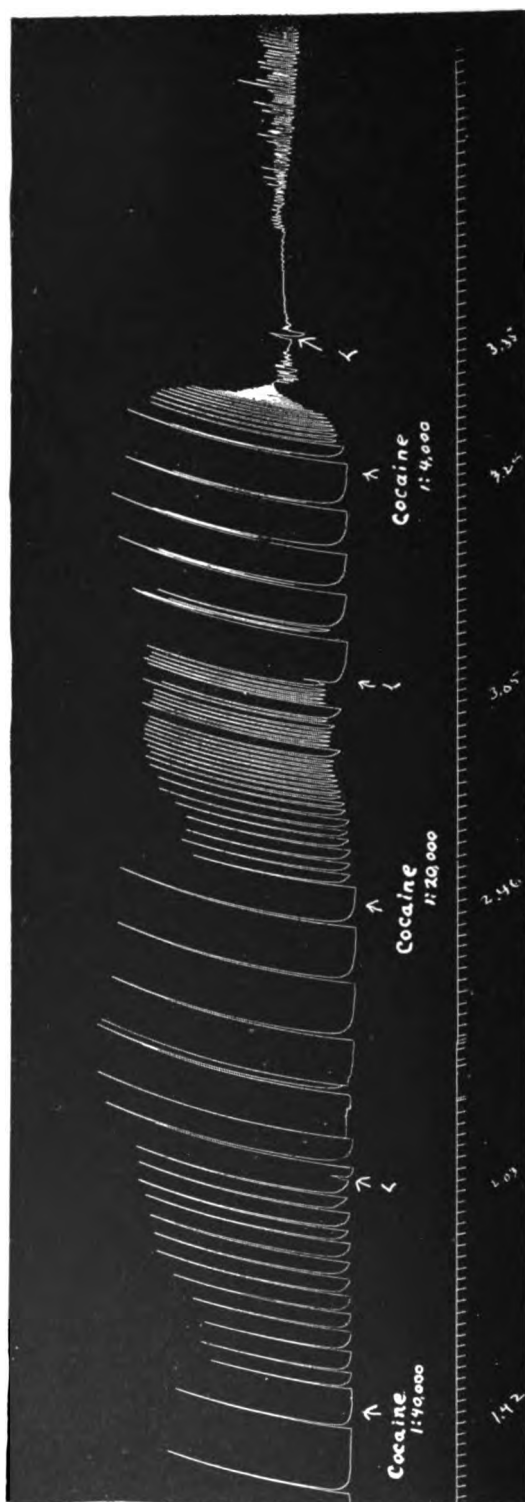
1. Tracings showing the comparative effects of 1 to 10,000 dilutions of cocaine and novocaine on the heart of *Rana esculentia* when perfused by Straub's method. Down-stroke, systole; upstroke, diastole.



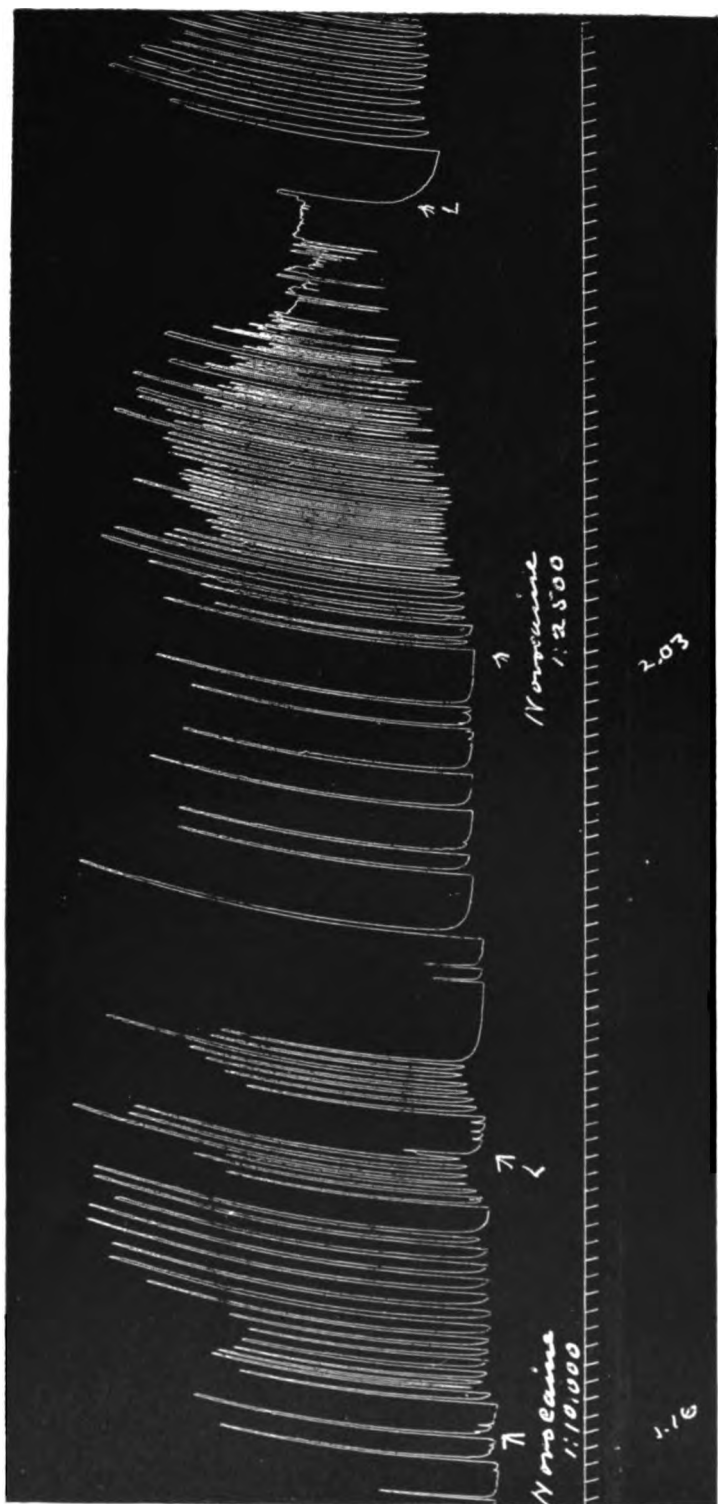
2. Tracings showing the comparative effects of 1 to 20,000 dilutions of cocaine and novocaine in Clarke's solution on the heart of *Rana pipiens* when perfused through the vena cava. Downstroke, systole; upstroke, diastole.



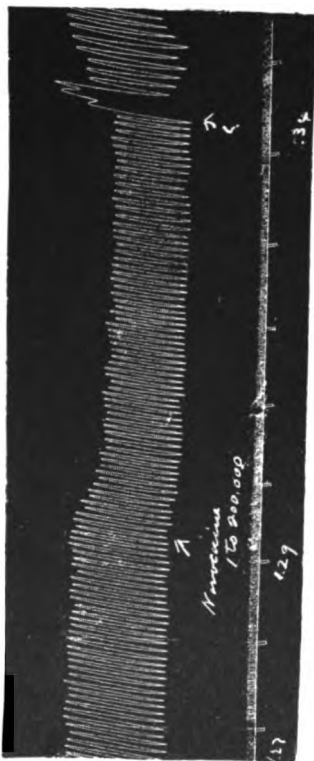
3. Tracings showing comparative effects of 1 to 100,000 dilutions of cocaine and novocaine on isolated ureter of the dog. Upstroke denotes contraction.



4. Tracing showing effects of various concentrations of cocaine on isolated ureter of the dog. Upstroke denotes contraction.



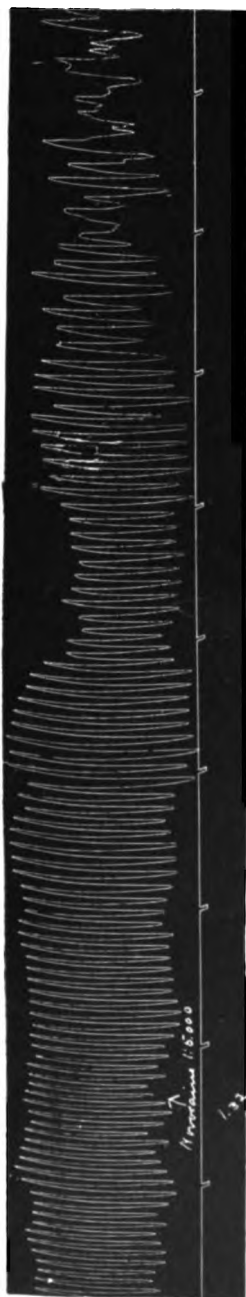
5. Tracing showing effects of novocaine on isolated ureter of the dog. Upstroke denotes contraction.



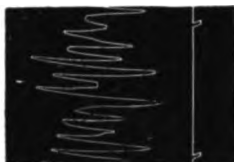
6. Tracings showing comparative effects of 1 to 200,000 dilutions of novocaine and cocaine on the isolated intestine of the rabbit. Upstroke denotes contraction. Note that cocaine causes an increase in the contraction while novocaine causes a decrease in the extent of the spontaneous contractions.



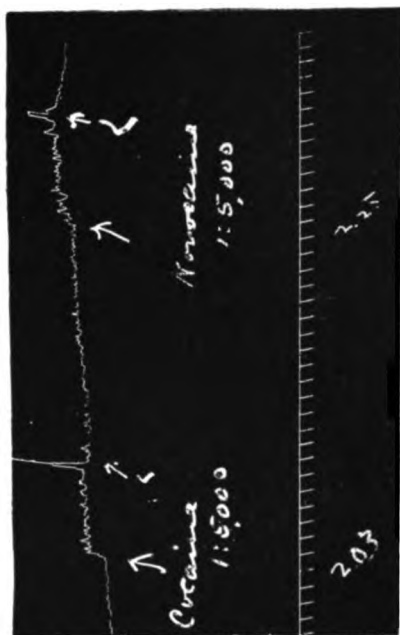
7. Tracing showing the effect of a 1 to 5,000 dilution of cocaine on the isolated intestine of the rabbit. Upstroke denotes contraction.

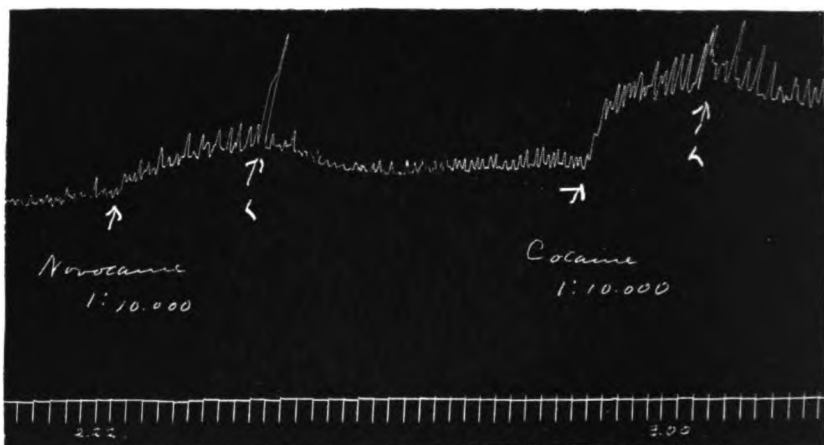


8. Tracing showing the effect of a 1 to 5,000 dilution of novocaine on the isolated intestine of the rabbit. Upstroke denotes contraction.

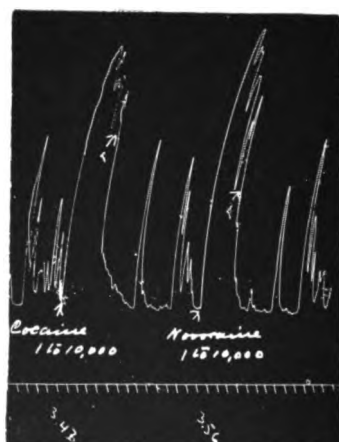


9. Tracings showing the effects of cocaine and novocaine on the isolated urinary bladder of the cat. Upstroke denotes contraction.

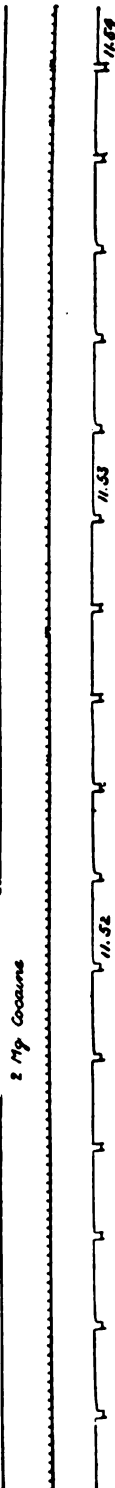




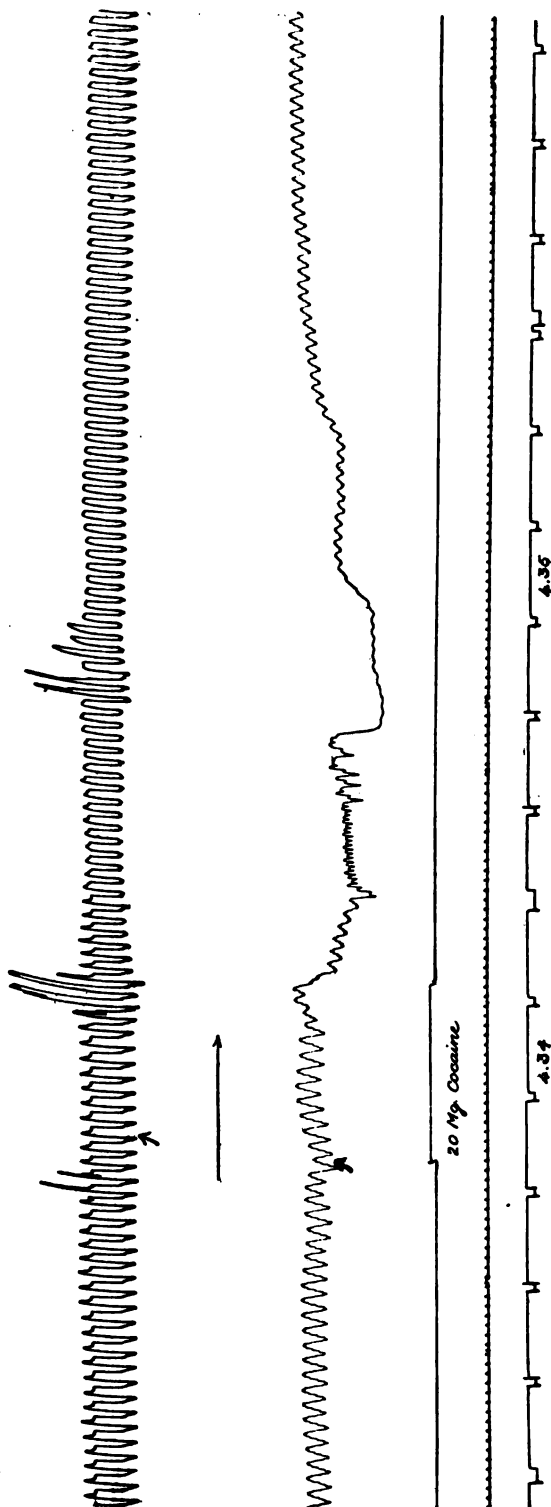
10. Tracing showing the effects of novocaine and cocaine on the isolated stomach (pyloric end) of the cat. Upstroke denotes contraction.



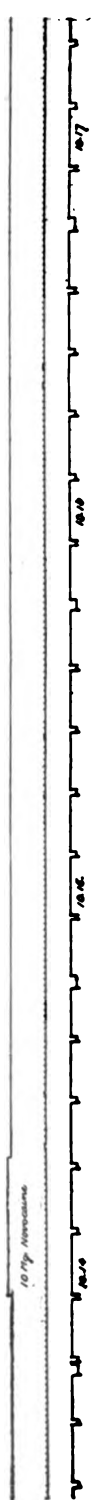
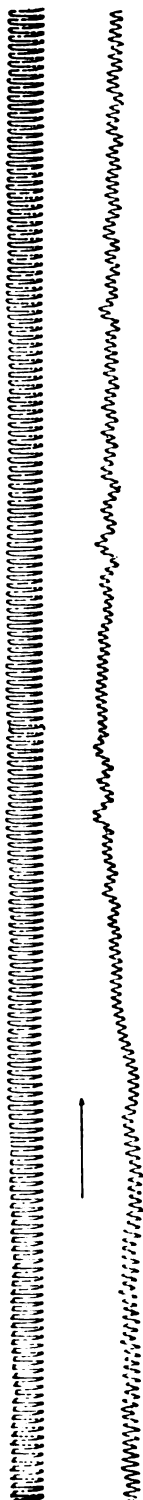
11. Tracing showing the effects of novocaine and cocaine on the isolated uterus of rabbit (non-pregnant). Upstroke denotes contraction.



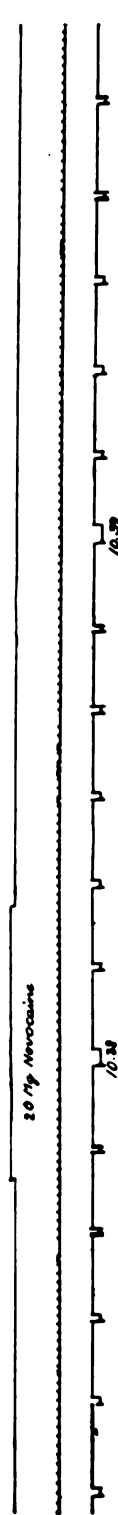
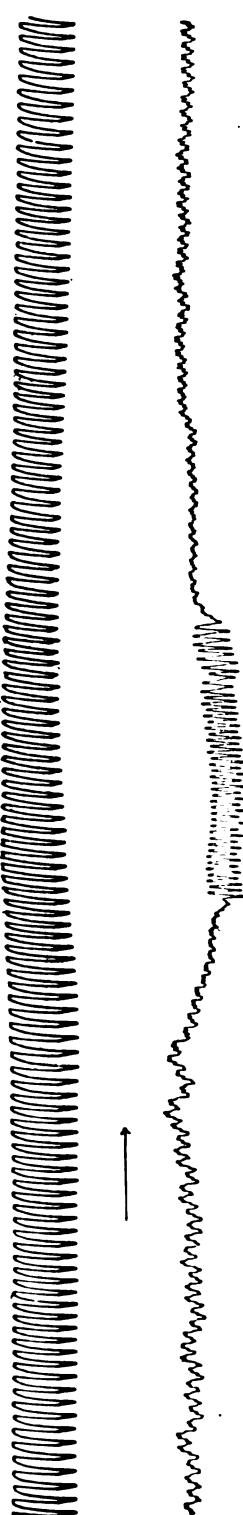
12. Tracings showing the effect of 2 mg. of cocaine injected intravenously into rabbit weighing 2.6 kg. Upper tracing shows effect on respiration (pleural cannula method) and lower shows effect on blood pressure. Note slight increase in rate of respiration and increase in height of blood pressure.



13. Tracings showing the effect of 20 mg. of cocaine injected intravenously in rabbit weighing 2.6 kg. Upper tracing shows effect on respiration as recorded by pleural cannula. Lower tracing shows effect on blood pressure.



14. Tracings showing effect of injection of 10 mg. of novocaine intravenously in a rabbit weighing 2 kg. (First injection.) Upper tracing shows effect on respiration (pleural cannula method). Note increase in depth of respiratory movements. Lower tracing shows effect on blood pressure.



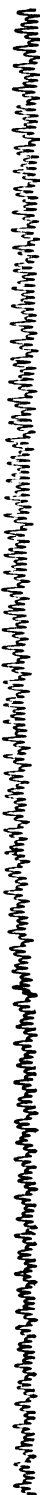
15. Tracings showing effect of injecting 20 mg. of novocaine in a 2.3 kg. rabbit. Upper tracing shows effect on respiration (pleural cannula method); lower tracing effect on blood pressure.



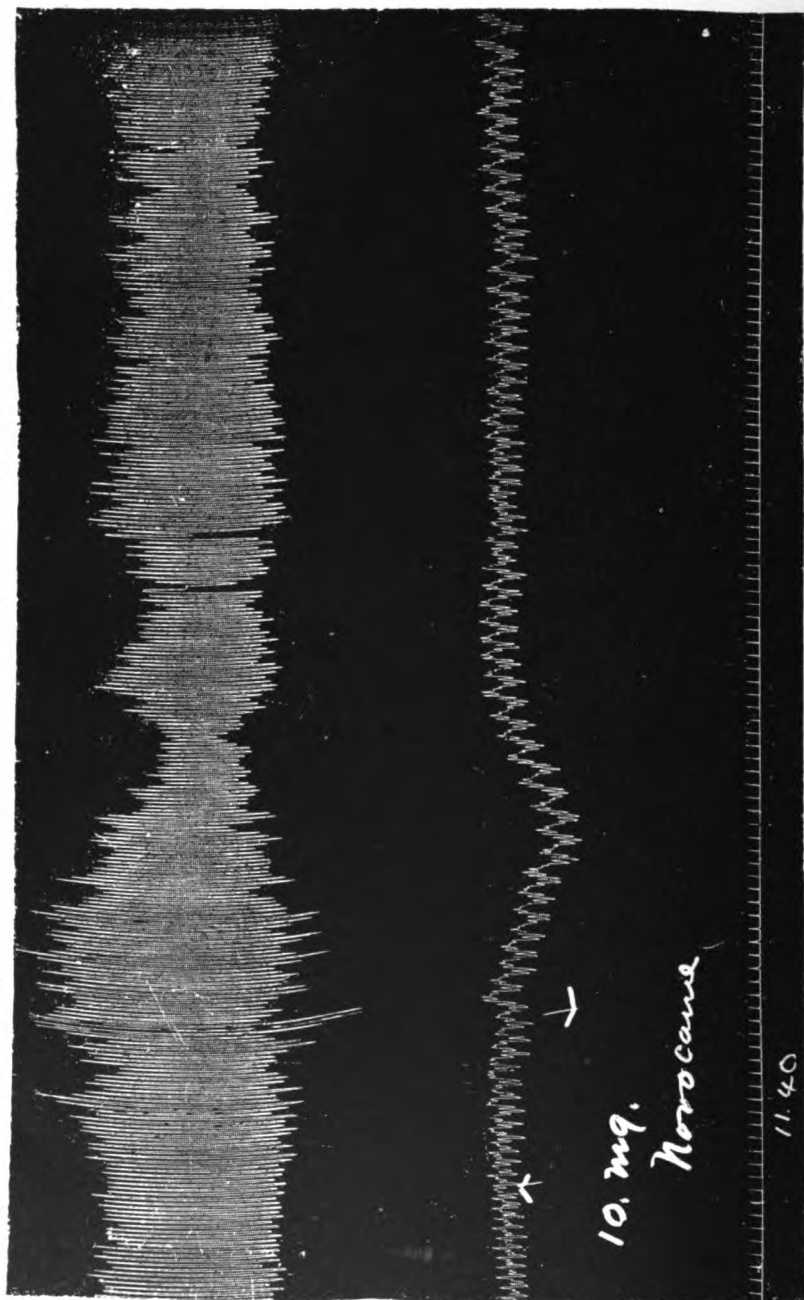
5 Mg. Novocaine



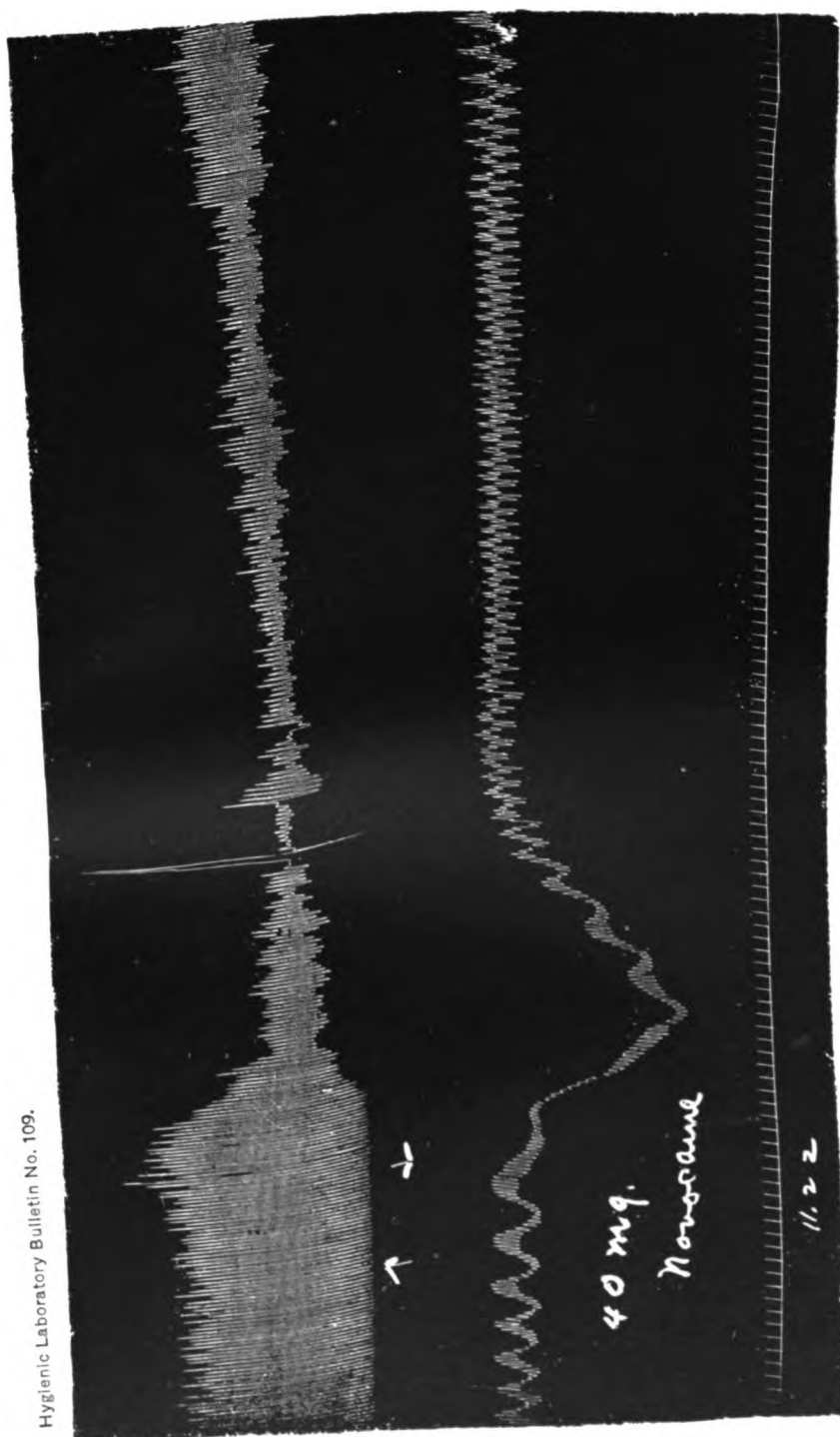
16. Tracings showing effect of injecting 5 mg. of novocaine into femoral vein of dog weighing 16 kg. Upper record shows effect on respiration as recorded by a pleural cannula and tambour; namely, a slight increase in the rate; also in the extent of chest movements. Lower record shows no effect on blood pressure.



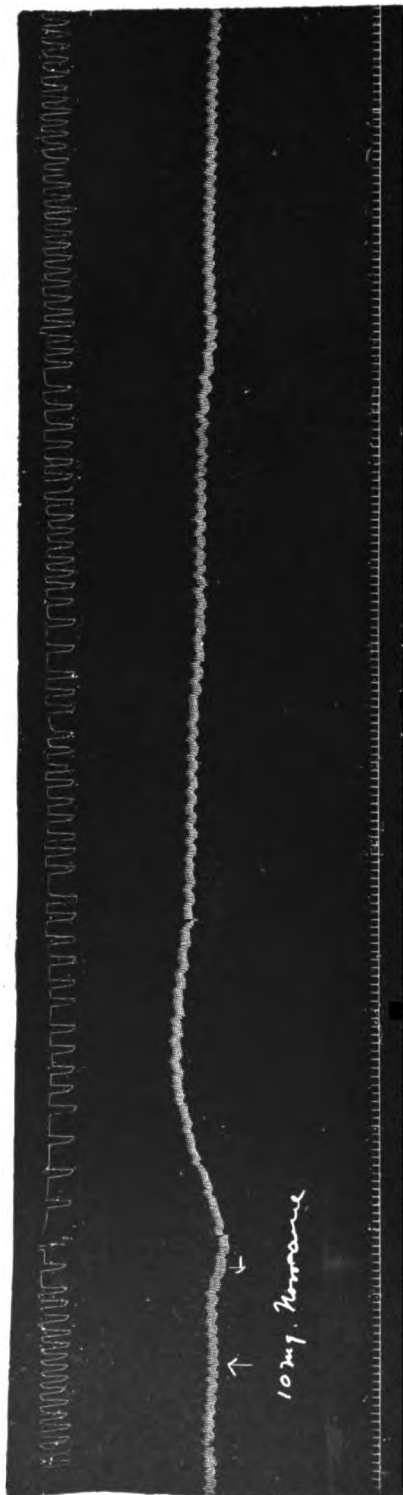
17. Tracings showing the effect of the intravenous injection of 25 mg. of novocaine (first injection) in a 5.45 kg. dog. Respiratory record (upper), obtained with pleural cannula, shows no effect on respiration while blood pressure record (lower) shows slight increase in pressure.



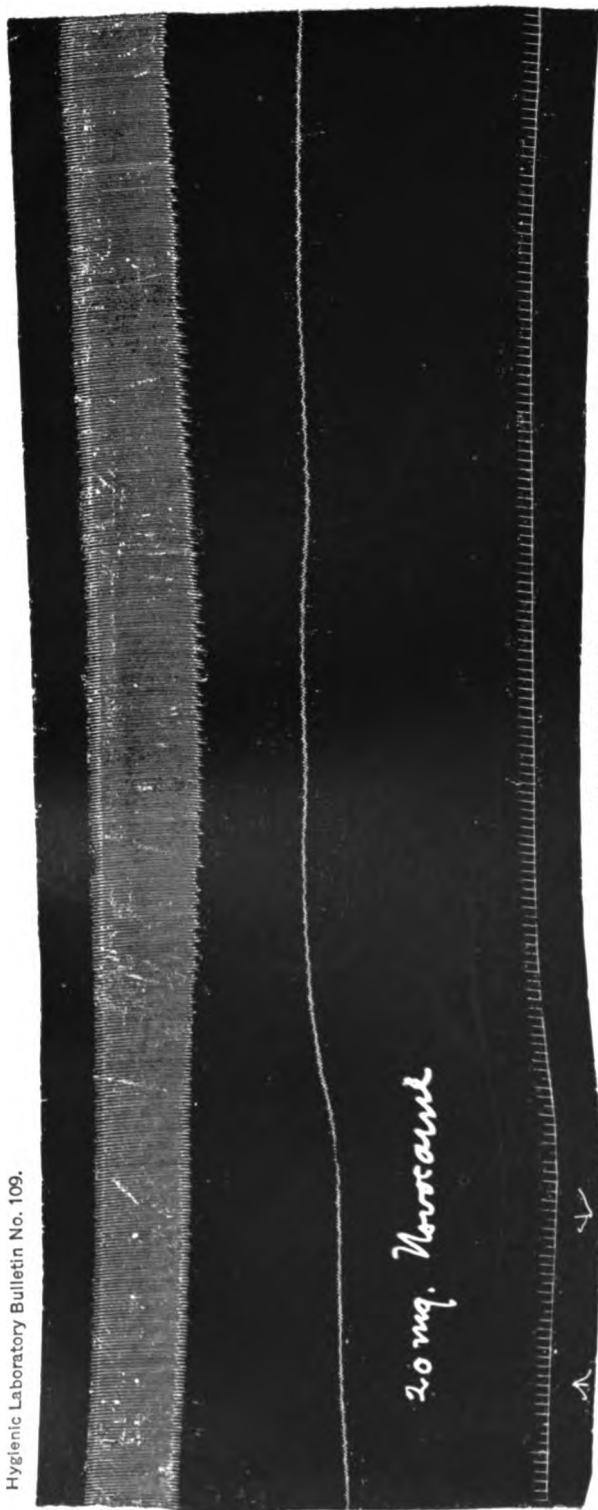
18. Tracings showing effect of injecting 10 mg. of novocaine into the femoral vein of dog weighing 9.5 kg. Upper record shows effect on respiration as recorded by tambour placed over diaphragm. Lower record shows effect on blood pressure. A slight increase in depth of respiration is noted followed by a decrease in depth, the blood pressure being lowered somewhat.



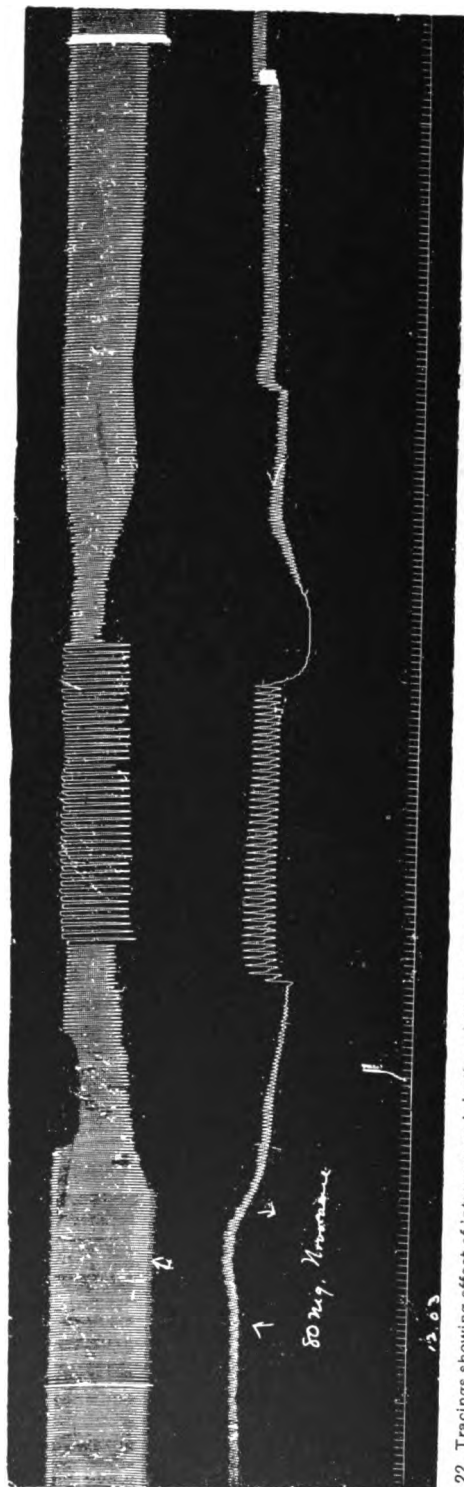
19. Tracings showing the effect of injecting 40 mg. of novocaine in the same dog which was used to obtain tracing in figure 18. The depressing effects on the respiration and blood pressure are more marked than in figure 18.



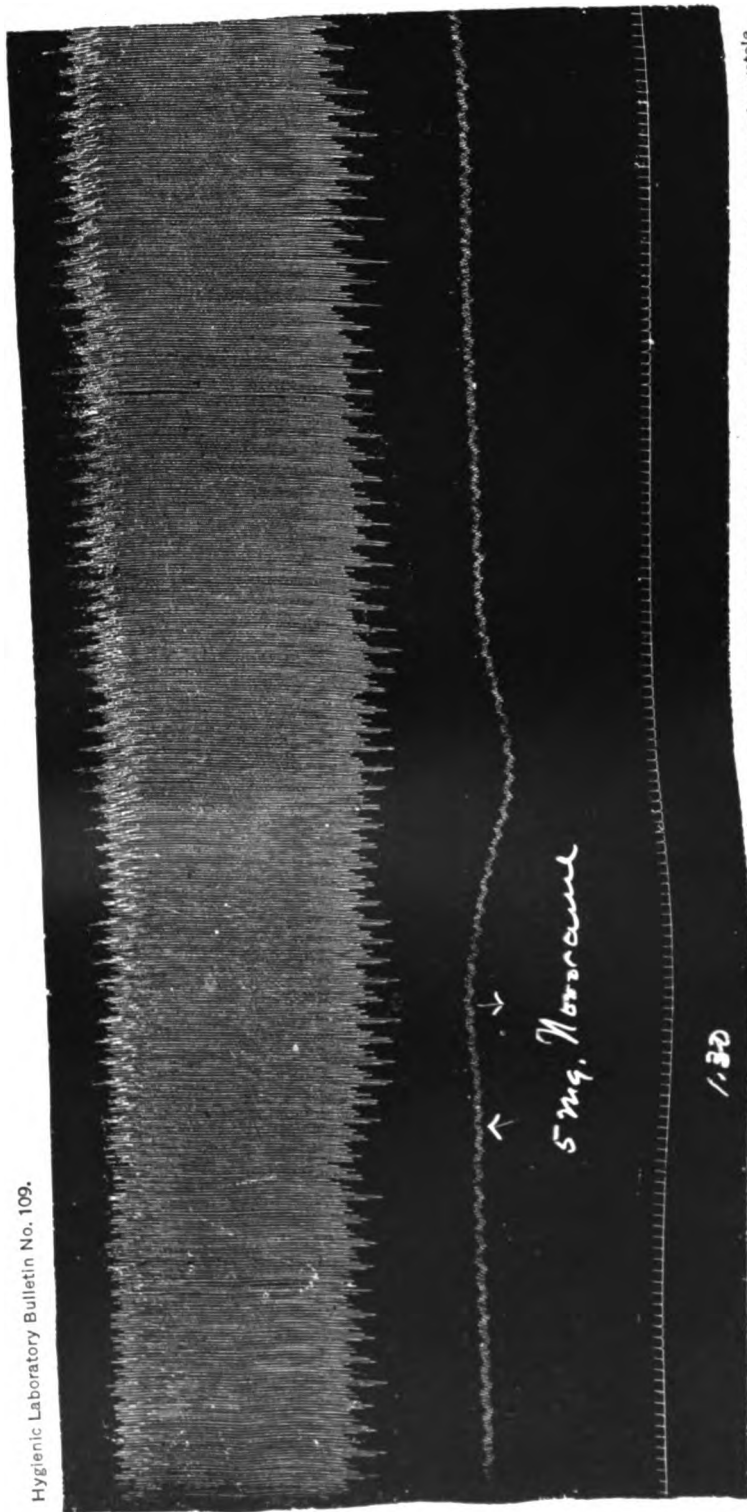
20. Tracings showing effect of intravenous injection of 10 mg. of novocaine in cat weighing 3 kg. Upper tracing shows effect on respiration (tambour method). Note decrease in rate of respiration. Lower tracing shows effect on blood pressure.



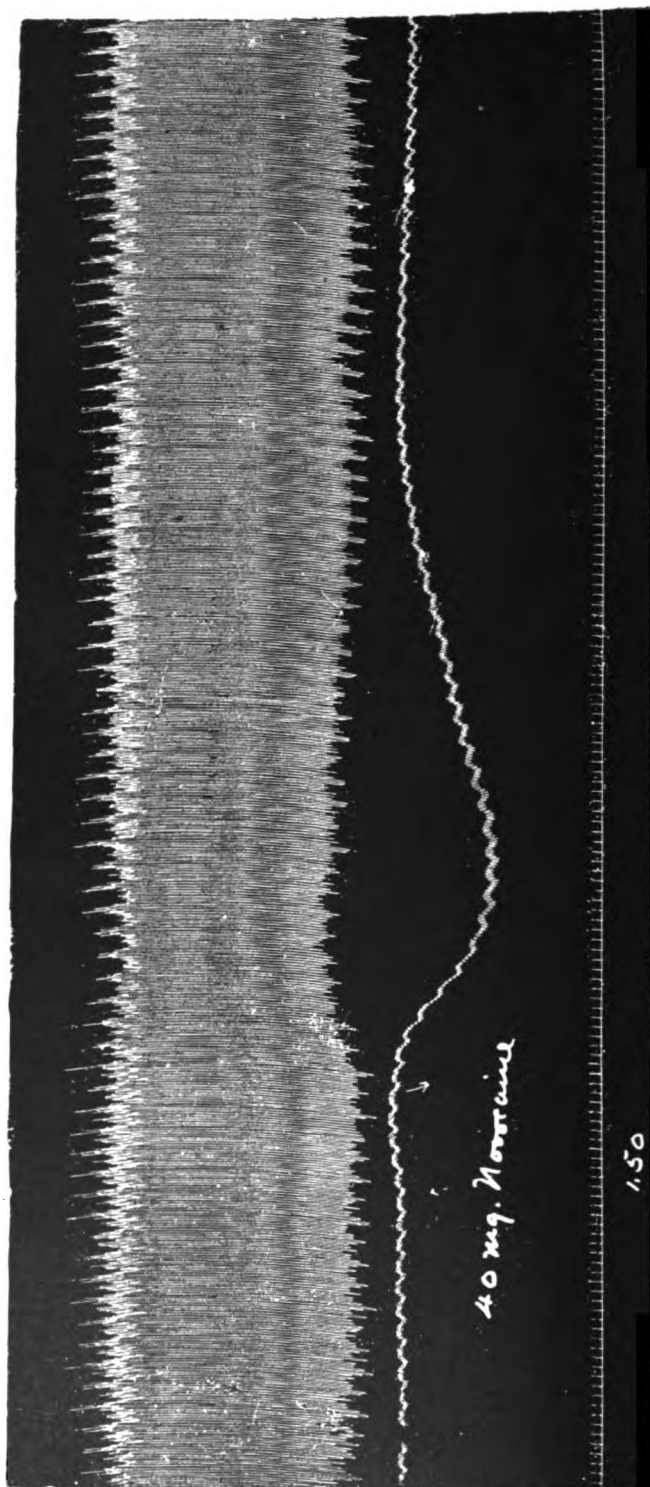
21. Tracings showing effect of intravenous injection of 20 mg. of novocaine on left ventricle and blood pressure of same cat used for figure 9. Upper tracing shows effect on left ventricle; lower tracing shows effect on blood pressure. Note increase in extent of systolic contraction.



22. Tracings showing effect of intravenous injection of 80 mg. of novocaine in cat weighing 5 kg. Upper tracing (left ventricle); lower tracing (blood pressure). Note decrease in systole and marked cardiac slowing, together with decrease in blood pressure.



23. Tracings showing effect of intravenous injection of 5 mg. of novocaine in dog weighing 9.5 kg. Upper tracing shows effect on left ventricle. Note increase in systole. Lower tracing shows effect on blood pressure. A fall in blood pressure occurs even though the heart contraction is stronger.



24. Tracings showing effect of intravenous injection of 40 mg. of novocaine in same dog as used for figure 23. Upper tracing (left ventricle). Lower tracing (blood pressure).

ministration in clinical cases in which the blood pressure is low or in which the heart is at fault.

4. Great care should be exercised in the injection of novocaine subcutaneously, in order to avoid its entrance into the circulation, thereby increasing its toxicity.

5. Individual susceptibility should always be considered in the administration of either cocaine or novocaine.

BIBLIOGRAPHY.

ANREP, B. VON.

1879.—Ueber die physiologische Wirkung des Cocain. Arch. f. d. ges. Physiol., Bonn., 1879-80, vol. 21, p. 38.

BEGG, R. CAMPBELL.

1913.—Toxic Symptoms Arising During the Use of Novocaine. Lancet, Lond., 1913, vol. 184, p. 561.

RIBERFELD, JOHANNES.

1905.—Pharmakologisches ueber Novocaine. Med. Klin. 1905, No. 48, p. 1218.

BLYTH, ALEXANDER WYNTER, and BLYTH, MEREDITH WYNTER.

1906.—Poisons; Their Effects and Detection. p. 356.

BRAUN, HEINRICH.

1914.—Local Anesthesia. Trans. of 3d Germ. Ed. into English by Percy Shields. 1914. pp. 124, 125.

CUSHNY, A. R.

1915.—Pharmacology and Therapeutics, or the Action of Drugs. pp. 861, 862.

DANIELSEN, WILHELM.

1905.—Poliklinische Erfahrungen mit dem neuen Lokal Anästhetikum. München. Med. Wchnschr. 1905, vol. 52, p. 2218.

EASTMAN, JOSEPH RILUS; EREMAN, BERNHARD, and BONN, HARRY K.

1916.—Index of Toxicity of Novocaine-Adrenalin Injected Intravenously. Ann. Surg. Phila., vol. 63, p. 619.

FALK, EDMUND.

1890.—Ueber Nebenwirkungen und Intoxicationen bei der Anwendung neuerer Arzneimittel. Cocain. Therap. Monatsh. Vol. 4, p. 511.

FILEHNE, WILHELM.

1887.—Die local-anästhesirende Wirkung von Benzoylderivaten. Berl. Klin. Wchnschr. Vol. 24, p. 107.

FISCHER, GUIDO, and RIETHMULLER, RICHARD H.

1914.—Local anesthesia in dentistry. 2nd Am. Ed. 1914, p. 110.

FULLETON, ANDREW.

1913.—Note on a Series of Fifty-five Cases of Suprapubic Prostatectomy, with Four Deaths. Brit. M. J. Lond. Vol. 1, p. 832.

GARBETT, M.

1910.—Death from Spinal Injection of Novocaine and Strychnine. Brit. M. J. Lond. Vol. 1, p. 690.

GIFFEN, R. B. and GUNDRUM, F. F.

1914.—Novocain poisoning. Calif. State M. J. Vol. 12, p. 415.

HAISEY, JOHN TAYLOR.

1914.—Pharmacology, Clinical and Experimental. p. 184.

KEHR, —

1910.—Ein fall von Novokainvergiftung. *Deutsche Monatschr. f. Zahnh.* Vol. 28, p. 48.

HEINEKE, H. and LÄWEN, A.

1905.—Experimentelle untersuchungen und Klinische Erfahrungen über die Verwertbarkeit von Novokain für die örtliche Anasthesie. *Deutsche Ztschr. f. Chir.* Vol. 80, p. 180.

HOFMANN, C.

1906.—Ueber die Dosierung und Darreichungsform der analgsesierenden Mittel bei der Lumbalanaesthesie. *Münch. Med. Wchnschr.* Vol. 2, p. 2565.

HOLMAN, C. COLGATE.

1916.—Spinal Anesthesia, with Special Reference to the Use of Novocaine. *Lancet, Lond.* Vol. 1, p. 955.

KRECKE, —

1910.—Therapeutic Notes. *München. Med. Wchnschr.* Vol. 57, p. 2447.

KUBODA, M.

1915.—On the Action of Cocaine. *J. Pharmacol. Exper. Therap.* Vol. 7, p. 423.

LE BROCCQ, C. N.

1909.—Report on the Local Anaesthetics Recommended as Substitutes for Cocaine. *Brit. M. J.* Vol. 1, p. 783.

LIEBL, FRITZ.

1906.—Ueber Lokalanästhesie mit Novokain-Suprarenin. *München Med. Wchnschr.*, 1906. Vol. 53, p. 201.

LEVY, J. M., and HATCHER, ROBERT A.

1915.—Observations on the Relative Toxicity of Novocaine and Cocaine. *Items Interest.* Vol. 37, p. 721.

MARSHALL, CHARLES ROBERTSHAW.

1911.—On the Toxicity of Local Anesthetics. Memorial volume of scientific papers to commemorate the 500th anniversary of St. Andrews University, Scotland. P. 343.

MARSHALL, JOHN S.

1914.—A Case of Novocaine Peridental Anesthesia Followed by Unpleasant Symptoms. *Items Interest*, 1914. Vol. 36, p. 220.

MATTISON, J. B.

1891.—Cocaine poisoning. *Med. Surg. Reporter, Phila.* Vol. 65, p. 645.

MICHELSSON, FRIEDRICH.

1912.—Der gegenwärtige Stand der Lumbalanästhesie. *Ergeb. Chir. u. Orthopäd.* Vol. 4, p. 44.

MINOR, JAMES L.

1885.—Caution in the Use of Cocaine. *Med. Rec.* Vol. 27, p. 147.

MOSSO, UGOLINO.

1887.—Ueber die physiologische Wirkung des Cocaina. *Arch. f. exper. Path. u. Pharmacol.* Vol. 23, p. 153.

MYER, HANS H., and GOTTLIEB, R.

1914.—Die Experimentelle Pharmakologie. Pp. 117, 129, and 130.

NAST-KOLB, A.

1908.—Die Operation von Leisten und Schenkelhernien in Lokaler anästhesie. *München, Med. Wchnschr.* Vol. 55, p. 1739.

PAGE, H. M.

1915.—Spinal Anesthesia in 43 Suprapubic Prostatectomies. *Lancet, Lond.* Vol. 1, p. 1015.

PIQUAND, G., and DREYFUS, LUCIEN.

1910.—Recherches sur quelques anesthésiques locaux. *J. physiol. et path. gén. Par.* Vol. 12, p. 70.

POULSSON, E.

1890.—Beiträge zur Kenntniss der pharmakologischen Gruppe des Cocains. *Arch. f. exper. Path. u. Pharmacol.* Vol. 27, p. 301.

RICCI, A.

1887.—Eine Cocainvergiftung. *Deutsche Med. Wchnschr.* No. 41. Vol. 31, p. 894.

SCANDOLA, CESARE.

1915.—Intorno ad un caso di morte per iniezione spinale di novocaina. *Gazzetta degli ospedali e delle cliniche.* Vol. 36, p. 50.

SCHLESINGER, ARTHUR.

1912.—Tod nach Lokalnarkose. *Med. Klin.* Vol. 8, p. 1746.

SCHMIDT, ERHARD.

1905.—Ueber Novokain-Höchst. *München Med. Wchnschr.* Vol. 52, p. 2220.

STOCKMAN, RALPH.

1886.—The Physiological Action of Benzoyl-Ecgonine. *Pharm. J. Tr., Lond.* Vol. 16, p. 897.

The Action of Benzoyl-Ecgonine. *J. Anat. Physiol. Lond.* Vol. 21, p. 46.

STRAUB, WALTHER.

1901.—Ueber die Wirkung des Antiarins am ausgeschnittenen suspendirten Froschherzen. *Arch. f. Exper. Path. u. Pharmacol.* Vol. 45, p. 346.

WITTHAUS, R. A., and BECKER, TRACY C.

1911.—Medical Jurisprudence, Forensic Medicine and Toxicology. p. 901.

HYGIENIC LABORATORY BULLETINS OF THE PUBLIC HEALTH SERVICE.

The Hygienic Laboratory was established in New York, at the Marine Hospital on Staten Island, August, 1887. It was transferred to Washington, with quarters in the Butler Building, June 11, 1891, and a new laboratory building, located in Washington, was authorized by act of Congress March 3, 1901.

The following *bulletins* [Bulls. Nos. 1-7, 1900 to 1902, Hyg. Lab., U. S. Mar.-Hosp. Serv., Wash.] have been issued:

*No. 1.—Preliminary note on the viability of the *Bacillus pestis*. By M. J. Rosenau.

No. 2.—Formalin disinfection of baggage without apparatus. By M. J. Rosenau.

*No. 3.—Sulphur dioxid as a germicidal agent. By H. D. Geddings.

*No. 4.—Viability of the *Bacillus pestis*. By M. J. Rosenau.

No. 5.—An investigation of a pathogenic microbe (*B. typhi murium* Danysz) applied to the destruction of rats. By M. J. Rosenau.

*No. 6.—Disinfection against mosquitoes with formaldehyde and sulphur dioxid. By M. J. Rosenau.

†No. 7.—Laboratory technique: Ring test for indol, by S. B. Grubbs and Edward Francis; Collodium sacs, by S. B. Grubbs and Edward Francis, Microphotography with simple apparatus, by H. B. Parker.

By act of Congress approved July 1, 1902, the name of the "United States Marine-Hospital Service" was changed to the "Public Health and Marine-Hospital Service of the United States," and three new divisions were added to the Hygienic Laboratory.

Since the change of name of the service the bulletins of the Hygienic Laboratory have been continued in the same numerical order, as follows:

*No. 8.—Laboratory course in pathology and bacteriology. By M. J. Rosenau. (Revised edition, March, 1904.)

†No. 9.—Presence of tetanus in commercial gelatin. By John F. Anderson.

*No. 10.—Report upon the prevalence and geographic distribution of hookworm disease (uncinariasis or ancylostomiasis) in the United States. By Ch. Wardell Stiles.

*No. 11.—An experimental investigation of *Trypanosoma lewisi*. By Edward Francis.

*No. 12.—The bacteriological impurities of vaccine virus; an experimental study. By M. J. Rosenau.

*No. 13.—A statistical study of the intestinal parasites of 500 white male patients at the United States Government Hospital for the Insane; by Philip H. Garrison, Brayton H. Ransom, and Earle C. Stevenson. A parasitic roundworm (*Agamomermis culicis* n. g., n. sp.) in American mosquitoes (*Culex sollicitans*); by Ch. Wardell Stiles. The type species of the cestode genus *Hymenolepis*; by Ch. Wardell Stiles.

*No. 14.—Spotted fever (tick fever) of the Rocky Mountains; a new disease. By John F. Anderson.

*No. 15.—Inefficiency of ferrous sulphate as an antiseptic and germicide. By Allan J. McLaughlin.

*No. 16.—The antiseptic and germicidal properties of glycerin. By M. J. Rosenau.

*No. 17.—Illustrated key to the trematode parasites of man. By Ch. Wardell Stiles.

*No. 18.—An account of the tapeworms of the genus *Hymenolepis* parasitic in man, including reports of several new cases of the dwarf tapeworm (*H. nana*) in the United States. By Brayton H. Ransom.

*No. 19.—A method for inoculating animals with precise amounts. By M. J. Rosenau.

*No. 20.—A zoological investigation into the cause, transmission, and source of Rocky Mountain "spotted fever." By Ch. Wardell Stiles.

*No. 21.—The immunity unit for standardizing diphtheria antitoxin (based on Ehrlich's normal serum). Official standard prepared under the act approved July 1, 1902. By M. J. Rosenau.

*No. 22.—Chloride of zinc as a deodorant, antiseptic, and germicide. By T. B. McClintic.

*No. 23.—Changes in the Pharmacopœia of the United States of America. Eighth Decennial Revision. By Reid Hunt and Murray Galt Motter.

No. 24.—The International Code of Zoological Nomenclature as applied to medicine. By Ch. Wardell Stiles.

*No. 25.—Illustrated key to the cestode parasites of man. By Ch. Wardell Stiles.

*No. 26.—On the stability of the oxidases and their conduct toward various reagents. The conduct of phenolphthalein in the animal organism. A test for saccharin, and a simple method of distinguishing between cumarin and vanillin. The toxicity of ozone and other oxidizing agents to lipase. The influence of chemical constitution on the lypolytic hydrolysis of ethereal salts. By J. H. Kastle.

*No. 27.—The limitations of formaldehyde gas as a disinfectant with special reference to car sanitation. By Thomas B. McClintic.

*No. 28.—A statistical study of the prevalence of intestinal worms in man. By Ch. Wardell Stiles and Phillip E. Garrison.

*No. 29.—A study of the cause of sudden death following the injection of horse serum. By M. J. Rosenau and John F. Anderson.

†No. 30.—I. Maternal transmission of immunity to diphtheria toxine. II. Maternal transmission of immunity to diphtheria toxine and hypersusceptibility to horse serum in the same animal. By John F. Anderson.

†No. 31.—Variations in the peroxidase activity of the blood in health and disease. By Joseph H. Kastle and Harold L. Amoss.

†No. 32.—A stomach lesion in guinea pigs caused by diphtheria toxine and its bearing upon experimental gastric ulcer. By M. J. Rosenau and John F. Anderson.

*No. 33.—Studies in experimental alcoholism. By Reid Hunt.

†No. 34.—I. *Agamofilaria georgiana* n. sp., an apparently new roundworm parasite from the ankle of a negress. II. The zoological characters of the roundworm genus *Filaria* Mueller, 1787. III. Three new American cases of infection of man with horsehair worms (species *Paragordius varius*), with summary of all cases reported to date. By Ch. Wardell Stiles.

†No. 35.—Report on the origin and prevalence of typhoid fever in the District of Columbia. By M. J. Rosenau, L. L. Lumsden, and Joseph H. Kastle. (Including articles contributed by Ch. Wardell Stiles, Joseph Goldberger, and A. M. Stimson.)

†No. 36.—Further studies upon hypersusceptibility and immunity. By M. J. Rosenau and John F. Anderson.

†No. 37.—Index-catalogue of medical and veterinary zoology. Subjects: Trematoda and trematode diseases. By Ch. Wardell Stiles and Albert Hassall.

No. 38.—The influence of antitoxin upon post-diphtheritic paralysis. By M. J. Rosenau and John F. Anderson.

† No. 39.—The antiseptic and germicidal properties of solutions of formaldehyde and their action upon toxins. By John F. Anderson.

† No. 40.—1. The occurrence of a proliferating cestode larva (*Sparganum proliferum*) in man in Florida, by Ch. Wardell Stiles. 2. A reexamination of the type specimen of *Filaria restiformis* Leydy, 1880=*Agramomermis restiformis*, by Ch. Wardell Stiles. 3. Observations on two new parasitic trematode worms: *Homalogaster philippinensis* n. sp. *Agamodistomum nanus* n. sp., by Ch. Wardell Stiles and Joseph Goldberger.

† No. 41.—Milk and its relation to the public health. By various authors.

† No. 42.—The thermal death points of pathogenic microorganisms in milk. By M. J. Rosenau.

† No. 43.—The standardization of tetanus antitoxin (an American unit established under authority of the act of July 1, 1902). By M. J. Rosenau and John F. Anderson.

No. 44.—Report No. 2 on the origin and prevalence of typhoid fever in the District of Columbia, 1907. By M. J. Rosenau, L. L. Lumsden, and Joseph H. Kastle.

† No. 45.—Further studies upon anaphylaxis. By M. J. Rosenau and John F. Anderson.

No. 46.—*Hepatozoon perniciosum* (n. g., n. sp.); a hæmogregarine pathogenic for white rats; with a description of the sexual cycle in the intermediate host, a mite (*Ielaps echidnimus*). By W. W. Miller.

No. 47.—Studies on thyroid: I. The relation of iodine to the physiological activity of thyroid preparations. By Reid Hunt and Atherton Seidell.

No. 48.—The physiological standardization of digitals. By Charles Wallis Edmonds and Worth Hale.

No. 49.—Digest of comments on the United States Pharmacopœia. Eighth decennial revision for the period ending December 31, 1905. By Murray Galt Motter and Martin I. Wilbert.

No. 50.—Further studies upon the phenomenon of anaphylaxis. By M. J. Rosenau and John F. Anderson.

No. 51.—Chemical tests for blood. By Joseph H. Kastle.

No. 52.—Report No. 3 on the origin and prevalence of typhoid fever in the District of Columbia (1908). By M. J. Rosenau, Leslie L. Lumsden, and Joseph H. Kastle.

No. 53.—The influence of certain drugs upon the toxicity of acetanillide and antipyrine. By Worth Hale.

No. 54.—The fixing power of alkaloids on volatile acids and its application to the estimation of alkaloids with the aid of phenolphthalein or by the Volhard method. By Elias Elvove.

No. 55.—Quantitative pharmacological studies; adrenalin and adrenalin-like bodies. By W. H. Schultz.

No. 56.—Milk and its relation to the public health. (Revised edition of Bulletin No. 41.) By various authors.

No. 57.—I. The presence of tubercle bacilli in the circulating blood in clinical and experimental tuberculosis. By John F. Anderson. II. The viability of the tubercle bacillus. By M. J. Rosenau.

No. 58.—Digest of comments on the Pharmacopœia of the United States of America (eighth decennial revision), and the National Formulary for the period ending December 31, 1906. By Murray Galt Motter and Martin I. Wilbert.

No. 59.—The oxidases and other oxygen catalysts concerned in biological oxidations. By Joseph Hoeling Kastle.

No. 60.—A study of the anatomy of *Watsonius* (n. g.), *Watsoni* of man, and of 19 allied species of mammalian trematode worms of the superfamily Paramphistomoidea. By Ch. Wardell Stiles and Joseph Goldberger.

No. 61.—Quantitative pharmacological studies; Relative physiological activity of some commercial solutions of epinephrin. By W. H. Schultz.

No. 62.—The taxonomic value of the microscopic structure of the stigmal plates in the tick genus *Dermacentor*. By Ch. Wardell Stiles.

†No. 63.—Digest of comments on the Pharmacopœia of the United States of America (eighth decennial revision) and the National Formulary (third edition) for the calendar year ending December 31, 1907. By Murray Galt Motter and Martin I. Wilbert.

No. 64.—Studies upon anaphylaxis with special reference to the antibodies concerned. By John F. Anderson and W. H. Frost.

No. 65.—Facts and problems of rabies. By A. M. Stimpson.

No. 66.—I. The influence of age and temperature on the potency of diphtheria antitoxin. By John F. Anderson. II. An organism (*Pseudomonas protea*) isolated from water, agglutinated by the serum of typhoid-fever patients. By W. H. Frost. III. Some considerations on colorimetry, and a new colorimeter. By Norman Roberts. IV. A gas generator in four forms, for laboratory and technical use. By Norman Roberts.

†No. 67.—The solubilities of the pharmacopœial organic acids and their salts. By Atherton Seidell.

No. 68.—The bleaching of flour and the effect of nitrites on certain medicinal substances. By Worth Hale.

No. 69.—The effects of restricted diet and of various diets upon the resistance of animals to certain poisons. By Reid Hunt.

No. 70.—A study of melting-point determinations with special reference to the melting-point requirements of the United States Pharmacopœia. By George A. Menge.

No. 71.—1. Some known and three new endoparasitic trematodes from American fresh-water fish. By Joseph Goldberger. 2. On some new parasitic trematode worms of the genus *Telorchis*. By Joseph Goldberger. 3. A new species of *Athesmia* from a monkey. By Joseph Goldberger and Charles G. Crane.

†No. 72.—I. Report on an outbreak of typhoid fever at Omaha, Nebr. (1909-1910), by L. L. Lumsden. II. The water supply of Williamson, W. Va., and its relation to an epidemic of typhoid fever. By W. H. Frost.

No. 73.—The effect of a number of derivatives of choline and analogous compounds on the blood pressure. By Reid Hunt and R. de M. Taveau.

No. 74.—Digitalis standardization and the variability of crude and of medicinal preparations. By Worth Hale.

No. 75.—Digest of comments on the Pharmacopœia of the United States of America (eighth decennial revision) and the National Formulary (third edition) for the calendar year ending December 31, 1908. By Murray Galt Motter and Martin I. Wilbert.

No. 76.—The physiological standardization of ergot. By Charles Wallis Edmunds and Worth Hale.

No. 77.—Sewage pollution of interstate and international waters with special reference to the spread of typhoid fever. By Allan J. McLaughlin.

No. 78.—Report No. 4 on the origin and prevalence of typhoid fever in the District of Columbia (1909). By L. L. Lumsden and John F. Anderson. (Including articles contributed by Thomas B. McClintic and Wade H. Frost.)

No. 79.—Digest of comments on the Pharmacopœia of the United States of America (eighth decennial revision) and the National Formulary (third edition) for the calendar year ending December 31, 1909. By Murray Galt Motter and Martin I. Wilbert.

No. 80.—Physiological studies in anaphylaxis. Reaction of smooth muscle from various organs of different animals to proteins. (Including reaction of muscle from nonsensitized, sensitized, tolerant, and immunized guinea pigs.) By William H. Schultz.

No. 81.—Tissue proliferation in plasma medium. By John Sundwall.

No. 82.—I. Method of standardizing disinfectants with and without organic matter. By John F. Anderson and Thomas B. McClintic. II. The determination of the phenol coefficient of some commercial disinfectants. By Thomas B. McClintic.

No. 83.—I. Sewage pollution of interstate and international waters with special reference to the spread of typhoid fever. II. Lake Superior and St. Marys River. III. Lake Michigan and the Straits of Mackinac. IV. Lake Huron, St. Clair River, Lake St. Clair, and the Detroit River. V. Lake Ontario and St. Lawrence River. By Allan J. McLaughlin.

No. 84.—Digest of comments on the Pharmacopœia of the United States of America (eighth decennial revision) and the National Formulary (third edition) for the calendar year ending December 31, 1910. By Murray Galt Motter and Martin I. Wilbert.

No. 85.—Index-catalogue of medical and veterinary zoology. Subjects: Cestoda and cestodaria. By Ch. Wardell Stiles and Albert Hassall.

No. 86.—Studies on typhus. By John F. Anderson and Joseph Goldberger.

No. 87.—Digest of comments on the Pharmacopœia of the United States of America (eighth decennial revision) and on the National Formulary (third edition) for the calendar year ending December 31, 1911. By Murray Galt Motter and Martin I. Wilbert.

No. 88.—Method for determining the toxicity of coal-tar disinfectants, together with a report on the relative toxicity of some commercial disinfectants. By Worth Hale.

No. 89.—Sewage pollution of interstate and international waters with special reference to the spread of typhoid fever. VI. The Missouri River from Sioux City to its mouth. By Allan J. McLaughlin.

No. 90.—Epidemiologic studies of acute anterior poliomyelitis. I. Poliomyelitis in Iowa, 1910. II. Poliomyelitis in Cincinnati, Ohio, 1911. III. Poliomyelitis in Buffalo and Batavia, N. Y., 1912. By Wade H. Frost.

No. 91.—I. The cause of death from subdural injections of antimeningitis serum. By Worth Hale. II. Some new cholera selective media. By Joseph Goldberger.

No. 92.—Gaseous impurities in the air of railway tunnels. By Atherton Sel-dell and Philip W. Meserve.

No. 93.—Digest of comments on the Pharmacopœia of the United States of America (eighth decennial revision) and on the National Formulary (third edition) for the calendar year ending December 31, 1912. By Murray Galt Motter and Martin I. Wilbert.

No. 94.—I. Collected studies on the insect transmission of *Trypanosoma evansi*. By M. Bruin Mitzmain. II. Summary of experiments in the transmission of anthrax by biting flies. By M. Bruin Mitzmain.

No. 95.—Laboratory studies on tetanus. By Edward Francis.

No. 96.—1. Report of investigation of coastal waters in the vicinity of Gulfport and Biloxi, Miss., with special reference to the pollution of shellfish. By R. H. Creel. 2. A comparison of methods for the determination of oxygen in

waters in presence of nitrite. By Elias Elvove. 3. Some new compounds of the choline type. III. Including preparation of monoacetate of *a, B* dioxy-*B*-methyl butane. By G. A. Menge. 4. The detection of white phosphorus in matches. By Earle B. Phelps. 5. The chemical composition of rubber in nursing nipples and in some rubber toys. By Earle B. Phelps and Albert F. Stevenson. 6. The analysis of thymol capsules. By Atherton Seidell. 7. Seasonal variation in the composition of the thyroid gland. By Atherton Seidell and Frederic Fenger. 8. Note on a new apparatus for use with the Winkler method for dissolved oxygen in water. By Hyman L. Shoub. 9. The pharmacological action of some serum preservatives. By Carl Voegtlin.

No. 97.—1. Some further siphonaptera. 2. A further report on the identification of some siphonaptera from the Philippine Islands. 3. The taxonomic value of the copulatory organs of the females in the order of siphonaptera. By Carroll Fox.

No. 98.—Digest of comments on the Pharmacopœia of the United States of America (eighth decennial revision) and on the National Formulary (third edition) for the calendar year ending December 31, 1913. By Murray Galt Motter and Martin I. Wilbert.

No. 99.—The Friedmann treatment of tuberculosis. A report of the board appointed for its investigation. By John F. Anderson and Arthur M. Stimson.

No. 100.—Pituitary standardization; a comparison of the physiological activity of some commercial pituitary preparations. By George B. Roth. 2. Examination of drinking water on railroad trains. By Richard H. Creel. 3 Variation in the epinephrine content of suprarenal glands. By Atherton Seidell and Frederic Fenger.

No. 101.—I. Complement fixation in tuberculosis. By A. M. Stimson. II. Report of an investigation of diphtheria carriers. By Joseph Goldberger, C. L. Williams, and F. W. Hatchel. III. The excretion of thymol in the urine. By Atherton Seidell. IV. The sterilization of dental instruments. By H. E. Hasseltine. V. A modification of Rose's method for the estimation of pepsin. By Maurice H. Givens.

No. 102.—I. Digitalis standardization. The physiological valuation of fat-free digitalis and commercial digitalin. By George B. Roth. II. Preliminary observations on metabolism in pellagra. By Andrew Hunter, Maurice H. Givens, and Robert C. Lewis.

No. 103.—I. Chemical changes in the central nervous system as a result of restricted vegetable diet. By Mathilde L. Koch and Carl Voegtlin. II. Chemical changes in the central nervous system in pellagra. By Mathilde L. Koch and Carl Voegtlin.

No. 104.—Investigation of the pollution and sanitary conditions of the Potomac watershed; with special reference to self-purification and sanitary condition of shellfish in the lower Potomac River. By Hugh S. Cumming. With plankton studies by W. C. Purdy and hydrographic studies by Homer P. Ritter.

No. 105.—Digest of comments on the Pharmacopœia of the United States of America and on the National Formulary for the calendar year ending December 31, 1914. By Martin I. Wilbert.

No. 106.—Studies in Pellagra. I. Tissue alteration in malnutrition and pellagra. By John Sundwall. II. Cultivation experiments with the blood and spinal fluid of pellagrins. By Edward Francis. III. Further attempts to transmit pellagra to monkeys. By Edward Francis.

No. 107. Changes in the Pharmacopœia and the National Formulary. A digest of the changes and requirements included in the Pharmacopœia of the United States (ninth decennial revision) and in the National Formulary (fourth issue),

with references to the titles not continued from the preceding editions. By Martin I. Wilbert.

No. 103.—Experimental studies with muscicides and other fly-destroying agencies. By Earle B. Phelps and A. F. Stevenson.

No. 109.—I. Pituitary standardization, II: The relative value of infundibular extracts made from different species of mammals and a comparison of their physiological activity with that of certain commercial preparations. By George B. Roth. II. Pharmacological studies with cocaine and novocaine; a comparative investigation of these substances in intact animals and on isolated organs. By George B. Roth.

In citing these bulletins bibliographers and authors are requested to adopt the following abbreviations: Bull. No. —, Hyg. Lab., Wash., pp. —.

The service will enter into exchange of publications with medical and scientific organizations, societies, laboratories, journals, and authors. ALL APPLICATIONS FOR THESE PUBLICATIONS SHOULD BE ADDRESSED TO THE "Surgeon General, U. S. Public Health Service, Washington, D. C.," EXCEPT THOSE MARKED (*) AND (†).

The publications marked (*) are no longer available for distribution by the Surgeon General of the Public Health Service. Copies of those marked (†) may, however, be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., who sells publications at cost, and to whom requests for publications thus marked should be made.



LANE MEDICAL LIBRARY
STANFORD UNIVERSITY MEDICAL CENTER
STANFORD, CALIFORNIA 94305
FOR RENEWAL: PHONE 497-6691

DATE DUE

--	--	--

RA
 421
 U582
 1916-17
 no. 106-
 109
 LANE

LANE MEDICAL LIBRARY
 STANFORD UNIVERSITY
 MEDICAL CENTER
 STANFORD, CALIF. 94305

RA
 421
 U582
 1916-17
 no. 106-109
 LANE

Hygienic Labora
 No. 8 (Aug. 1
 1930).
 -- Washington
 1930.
 146 no. : 11

HOLDINGS THIS
 30.

At head of ti
 Treasury Depart
 Marine Hospital
 States; no. 86-
 137-151, 153 Tr
 United States P
 no. 152, 154 Un

XPRAD
 A000173

850517
 DM /TS

